# The Chemical Age

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## Contents



***NOTICES :—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.***

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## Works Practice for Chemists

IN the presidential address of Professor Wynne, the retiring president of the Chemical Society, last week a plea was made for better facilities for enabling chemical students at Universities to gain some insight into works practice during their student days. The point is one of real practical interest and touches one of the weak spots in our educational arrangements. Professor Wynne is frankly right in his description of the attitude of many firms towards the University man who comes into the factory straight from the "schools," and is apt to be a little impracticable in his relations with workers and with the works organisation. It may be the true as well as the kind view that this is due simply to lack of experience, and that the difficulty would largely disappear if during their studies students were allowed to spend short periods in neighbouring works.

Why, asks Professor Wynne, should not the larger chemical firms be able to make some arrangement of this sort with University and technical school authorities ? The usual answer is that in most chemical works there are secret processes requiring to be jealously guarded; and, further, that the presence of students would be troublesome. Professor Wynne's answer is that such a scheme is already at work in Sheffield. There the metallurgical students at the University are allowed at intervals to enter the great steel works and see the work under actual factory conditions. There is no disorganisation of duties or leakage of secret knowledge ; on the contrary, the students are welcomed at the works and the experience is of great value to both parties. Is it, Professor Wynne asks, too much to hope that something of the same sort may be possible in connection with chemical works ? About the possibility there can be no more doubt than about the advantages of the system ; it is all a question of organisation between the Universities and the managers of industry. The Association of British Chemical Manufacturers has already done excellent work in introducing new ideas, and here is another field in which its good offices might be used with great advantage.

Another notable feature of the Chemical Society's meeting last week was the testimony paid to the work of the Department of Scientific and Industrial Research, more especially in the organisation of a large group of research associations in vital contact with various industries. Dr. A. W. Crossley, himself the director of one of the most important of these research associations, is in a good position to judge of their value, and both he and his predecessor are absolutely agreed on the soundness of the plan on which the work is proceeding and on the great value of its results. There was at one time some idea that the new Government research laboratory at Teddington might partly take over some of this work. That, however, is without foundation. The associations will continue on their present independent lines, and Professor Morgan's work will also be independent, though it must necessarily have a fundamental relation to all that is going on elsewhere. The building operations at Teddington, we regret to hear, have been delayed by trade difficulties, but by next June it is expected that the laboratory will be complete, though probably long before that date the staff will have been at work in temporary conditions.

## The Future of Acid Concentration

THERE are many chemists associated with the manufacture and concentration of sulphuric acid who hold the opinion that so far as the latter operation is concerned there is every likelihood of there being some important changes within the next decade. Certainly acid concentration opens up many problems in the economics of technical chemistry, which are, perhaps, not always given the close attention which they deserve, and few manufacturers have probably stopped to consider the disparity in working costs which exists, for instance, between the production of, say, a 92 per cent. acid and one of 96 per cent. strength. In connection with the more conventional forms of concentration plant it has, in fact, been pointed out that above a strength of 92 per cent. few concentrators operate

economically. An extra 4 or 6 per cent. not only reduces the productive capacity of the plant very materially, but the important factor of wear and tear is increased to an extent which is by no means commensurate with the value of the more highly concentrated acid which is obtained. One is tempted to ask whether some greater use will not in the future be made of the contact process and the utilisation of oleum in mixture with the weaker concentrated acids? It would seem that such a policy would offer many advantages from the point of view of elasticity in the way of ultimate strength; but, of course, it has to be borne in mind that, in comparison with the war years, the manufacture of, and demand for, oleum has fallen off considerably and not only have many of the contact plants been put out of service, but quite a number have been dismantled.

If, therefore, any change in the present methods of producing concentrated acids is to be looked for it is likely to take the form of a slow transition over a number of years and to depend primarily upon whether it becomes practically and economically possible to manufacture both chamber acid and oleum in a single plant. This dual production would, in fact, appear to be the crux of the whole problem, and it provides a most fascinating study for those who have the interests of the acid manufacturer at heart. We have been told that a combined plant of the kind is much nearer realisation than is generally supposed, and some of our readers may recollect the description of a plant which appeared in our issue for August 26, 1922. The design of the plant which was then described was calculated to achieve the dual purpose by dividing the process into two sections. The first section is essentially a chamber plant, while the second section embodied plant for the production of strong acid of any desired strength above, say, 92 per cent. and up to oleum of 20 per cent. Section 1 would deal with 72 per cent. of the total sulphur, while Section 2 would utilise the remainder. The article in question is well worth turning back to by those who are interested in the problem, for there is little question that such an arrangement would be quite feasible in operation, and by reason of its flexibility and low capital cost it would prove a distinct commercial proposition.

## B.D.C. Colours

THE very large range of dyestuffs already produced by the British Dyestuffs Corporation continues to be steadily added to, and the latest additions to their colour library contains samples of 24 direct colours, ranging in shade from 3 per cent. Chlorazol Fast Yellow 5GK to 7 per cent. Chlorazol Black GF, and a similar number of sulphur colours varying from 5 per cent. Thional Yellow GR to 15 per cent. Cross Dye Black 6R. In addition to detailed directions for working there is in each a useful table showing the properties of each dye as regards light, milling, etc.

Another volume contains a varied selection of recently produced dyestuffs, including a range of the Duranol colours for the dyeing of cellulose-acetate silk ("Celanese"), where they give particularly brilliant effects; Union dyestuffs, which give uniform solid shades on mixed materials consisting of wool, natural silk, and artificial silks other than "Celanese"; basic dyes for textile fabrics, of which Victoria Blue B is a beautiful example; alizarine, lake, direct, acid, and other types. These collections are bound in such a way that additions may be regularly made to keep them up to date, and one of the latest is the lake colour, Monolite Yellow G Lumps, which is put forward as a substitute for chrome yellow, and which may be used, among other purposes, as a paper surfacing colour. One specimen, a light and delicate shade, shows the effect where the proportions are 10 parts lake and 90 parts China Clay. In each case the colour samples are accompanied by notes on the special properties of the dyestuff, directions for use, and fastness qualities.

## Gasworks Ammonium Sulphate

FEW presidential addresses have been so full of technical interest as the one delivered by Mr. Phillip G. G. Moon, before the Southern Association of Gas Engineers and Managers last week. His appreciation of the value of experimentation and research, no less than his intimate knowledge of some of the essentially important chemical engineering problems of gasworks awaiting solution, merits unqualified commendation.

Despite the advance of scientific and technical knowledge, it is remarkable that the gas industry should still continue, as it has done for more than twenty years now, to remove the hydrogen sulphide from crude coal gas by means of oxide of iron, to sell spent oxide to the acid maker, and to purchase from him sulphuric acid for the manufacture of sulphate of ammonia. Few gasworks, however, are sufficiently large to be able to render themselves self-supporting by the erection of a sulphuric acid plant. However desirable such a step may be, no one will demur to the proposition that the process of ammonium sulphate manufacture, as conducted at gasworks, is a circuitous one. It should not be beyond the wit of man, or outside the realm of practicability to convert hydrogen sulphide to sulphur dioxide, and to bring the latter into solution as sulphurous acid for the absorption of ammonia in the production of ammonium sulphite, which can subsequently be oxidised to ammonium sulphate and sold as such. Mr. Moon forcibly reminds us that such a process is not the dream of a fertile imagination, when he instances the fact that many tons of sulphate were made at Berlin, and some at Bournemouth by the Burkheiser process prior to the war.

## The Burkheiser Process

THE first stage of the Burkheiser process involves the absorption of hydrogen sulphide in a special granular oxide of iron. When this material has absorbed its quantum of sulphur, the purifiers concerned are thrown out of action and the crude gas passes to another set of vessels. The second stage is the production of sulphur dioxide from the purifying medium, which has become sulphided. Here air is introduced, and the speed of the reaction is much greater than with existing gasworks practice, inasmuch as in the direct process a definite attempt is made to eliminate the intermediate reaction by

which the sulphide of iron is oxidised to ferric oxide, and free sulphur is deposited. The removal of intermediate reactions by accelerating the speed of chemical action invariably introduces difficulties. The Burkheiser process has proved no exception to this general rule. If this one stage of the process can be successfully overcome, there is good reason to believe that the direct process of sulphate of ammonia manufacture would be possible. What is now necessary is that research should be conducted in order to find an active iron oxide which will withstand a temperature of 600° C. without becoming friable and causing trouble by reason of excessive pressure.

This is essentially a problem for the chemist, and it should not be incapable of solution. Whether Mr. Moon is quite justified in suggesting that a stable salt composed of approximately two-thirds sulphate and one-third sulphite, is equal in all respects to sulphate of ammonia, is a matter of doubt. It has been affirmed by experimental stations which have had an opportunity of conducting field tests with mixtures of ammonium sulphate and ammonium sulphite, that the presence of the latter is prejudicial to the growth of many crops and cereals. The question of the oxidation of one-third sulphite to sulphate can, there is reason to believe, be effected at very little expense.

## Poison Gas Research

THE recent replies to inquiries in Parliament in reference to poison gas research and experiments indicate a considerable modification of official reticence since Sir William Pope, in a notable article in THE CHEMICAL AGE, pleaded for a frank recognition of chemistry as a branch of the national defence and protested against chemical warfare experts being classed with the people who shoot foxes. The information now disclosed shows what has long been privately known, that research and experiment have been proceeding on a growing scale; the only new point is the admission that soldiers have been subjected to experiment. A rather sinister turn has been given to this fact by some of the questions, but the procedure is capable of a very simple and not discreditable explanation. Science has never lacked enthusiasts or martyrs prepared to undergo risks in the search for more exact scientific data, and the suspicion that young men are forcibly placed in glass chambers, as we once saw some dogs in the Edgewood Arsenal, and subjected to gas concentrations for the enlightenment of the callous experimenter need not be seriously entertained. Toxic gases have to be accepted as a fact, and therefore need to be understood. Why such work should be enshrouded in mystery we have never understood, and we are glad to see the facts coming out.

## A Strike

OUR regrets are due to readers of THE CHEMICAL AGE for the unavoidable delay which occurred last week in the distribution of the journal. Owing to a strike on the part of binders the printing of numbers of weekly journals in London was seriously held up, and although the dispute was happily settled early on Friday morning, arrears of work had by that time so accumulated that a few days were required to work them off, with the result that this and numerous other journals were delayed. Had the situation been more clearly defined earlier in the week it might have been possible to advise advertisers and subscribers, but up to the last moment it was hoped that a settlement might be reached in time to avoid delay. We regret the unavoidable delay and desire to thank our readers for the forbearance they have kindly shown in the circumstances.

## Points from Our News Pages

A report and impressions of a memorable annual meeting and dinner of the Chemical Society (p. 326).

The inquiry opened before the Board of Trade into the question of a protective duty on superphosphates—manufacturers' and consumers' cases (p. 327).

The discussion on the chemical engineers' conference on crushing and grinding methods (p. 328).

New works of interest to all engaged in the chemical industry are reviewed (pp. 330–31).

The Alkali Manufacturers' Association are opposing the Gas Light and Coke Bill that was before the House on Thursday, March 26.

Important questions have been raised in the House with regard to the employment of soldiers for poison gas research tests (p. 329). Other questions of chemical interest are noted (p. 335).

The death is announced of Mr. George Arthur Knowles, Count Florestano de Carderel and Mr. George Linklater (p. 335).

Latest oil prices at London and Hull are given (p. 340).

Our London Market report records a continued improvement in the volume of business, with prices well maintained (p. 340).

Our Scottish report shows the Heavy Chemical Market still quiet with prices fairly steady (p. 343).

### Books Received

THE JOURNAL OF THE ROYAL TECHNICAL COLLEGE, GLASGOW. December, 1924. Glasgow: Robert Anderson, 142, West Nile Street. Pp. 138. 5s.

PRINCIPLES AND APPLICATIONS OF ELECTROCHEMISTRY. Vol. I.—Principles. By Jermain Creighton. London: Chapman and Hall, Ltd. Pp. 446. 20s.

## The Calendar

| 1925 Apr | | |
|---|---|---|
| 6 | Institution of the Rubber Industry: "Notes from a Pioneer on Indian Rubber from the Latex." Sir Henry Wickham. "Standardised Rubberware." Fordyce Jones. 8 p.m. | Engineers' Club, Coventry Street, London. |
| 6 | Ceramic Society: "Whieldon Pottery." W. Emery. "Fret Kilns." S. R. Hind and Dr. J. W. Mellor. | Central School of Science and Technology, Stoke-on-Trent. |
| 6 | Society of Chemical Industry (London Section): "The Constitution of Coal." Professor W. A. Bone. 8 p.m. | Royal Society of Arts, John Street, Adelphi. |
| 7 | Institute of Metals (Birmingham Section): Annual General Meeting. 7 p.m. | Chamber of Commerce, New Street, Birmingham. |
| 7 | Hull Chemical and Engineering Society: Annual Meeting. 7.45 p.m. | Grey Street, Park Street, Hull. |
| 7 | Society of Chemical Industry (Birmingham and Midland Section): Joint Meeting with the Chemical Engineering Group: "Hand *v.* Mechanical Burners for Sulphur-containing Materials." Papers by P. Parrish, J. Harris and G. A. Smy. 7.30 p.m. | White Horse Hotel, Congreve Street, Birmingham. |
| 10 | Institute of Metals (London Section): "Metals in the Gaseous State." C. H. M. Jenkins. Annual General Meeting. 7.30 p.m. | 85-88, The Minories, Tower Hill, London. |

# A Memorable Meeting of the Chemical Society

## The Nation's Duty to the Chemist

It would be difficult to recall within recent years a more memorable anniversary meeting and dinner of the Chemical Society than the gatherings of last week in London. In the afternoon the hall in Burlington House was crowded during the delivery of the retiring president's address, an admirably clear review of recent progress in scientific research; the evening assembly in the grand hall of the Hotel Victoria was both numerous and distinguished, the large proportion wearing decorations testifying to the extent of the service rendered by chemists during the war. The retirement of Professor W. P. Wynne from the chair after two years of devoted service was the occasion of a demonstration not only of respect and gratitude but of something almost approaching affection. In the tributes by Sir William Pope and Professor Philip in the afternoon, as well as in those by the new President and others in the evening, there was no trace or hint of conventional flattery, though in all cases the terms were generous. It was just a case of hard, unselfish, unsparing work for the cause of chemical science, given on the one side and accepted on the other with complete and equal sincerity. The new President (Dr. A. W. Crossley)—new to the office but not to the Society—made a good beginning. On taking the chair his words of thanks were few and appropriate. "I have the will," he said, "to serve you well; whether I have the capacity time will show. I do sincerely hope, however, that time will not bring you any disappointment or regret for the action you have just taken."

### Progress in Research

Apart from the interesting personal aspects of the meetings a few points of definite policy emerged. First, there were the testimonies of the retiring and the new President to the value of the work done by the Department of Scientific and Industrial Research. They sounded more like a concerted movement than an accidental parallel, and to Sir Frank Heath, the head of the Department, they must have been welcome words. Secondly, Dr. Crossley's accession to the chair promises to be associated with a definite movement for increased Government aid for chemical research and its natural corollary chemical publication, and here, again, Sir Frank Heath appeared to listen with something more than benevolent neutrality to the demand that chemistry deserves from the nation something in return for what it has given. Thirdly we had an incidental confession from Mr. Woolcock that the heads of the "big three" chemical organisations have agreed provisionally and in outline on a scheme for "Chemistry House," which may be sufficiently definite to enable a start to be made towards a central chemical headquarters.

Professor Wynne's presidential address took the form of a very careful and distinctly encouraging review of the progress of scientific research in this country. Delivered of necessity rather rapidly, it contains much too large a volume of facts and conclusions to be absorbed at a first hearing. Thanks to the suggestion of Sir William Pope it is to be published later, and should well repay a more leisured study. For the moment a few of the points emphasised may be noted. The essential thing is that research throughout the whole country, when the records are examined, does show a definite and gratifying advance. Pleading that nothing lower than the best is of any value, Professor Wynne was able still to say that the D.S.I.R. had done services to the country and to science so great as to be almost incredible in the light of pre-war experience. He protested against each university trying to cover the whole range of scientific study and suggested a reasonable degree of specialisation and a system of exchangeable scholarships.

One point of immediate practical interest to chemical manufacturers was mentioned. It was the complaint that when university-trained men enter works they do not readily fit into works practice and organisation. That, argued Professor Wynne, was not really the fault of the student, who often had had no experience of works practice, and he suggested that the larger firms might allow selected students from neighbouring universities to spend short periods in their works, working under actual factory conditions. The common objections were that secret processes might be exposed and that it was too much trouble. In Sheffield the problem had been satisfactorily solved. It was the custom there for metallurgical students to enter the great steel works, and they were welcomed there. If that is possible at Sheffield, Professor Wynne asked, is it too much to hope that something of the same sort may be introduced into chemical works? Here one's thoughts naturally turned to the A.B.C.M. as the body which might possibly get something done on these lines.

### Speeches at the Dinner

The toast of "The Chemical Society" was proposed by Sir Frank Heath in terms which showed a real sympathy with scientific effort, and it brought an interesting response from the President. "I have had," he said, "some experience of the professorial or professional side of chemistry; for the past five years I have had some experience of chemistry as applied to industry. I say with full deliberation that in my opinion the Department of Scientific and Industrial Research has founded in the industrial research associations a movement which is destined to play an important part in the future of this country. I should like to congratulate the Department on the efforts it has started and to say to the Department: 'Do not be in the least discouraged by any disparaging remarks about you.'"

An examination of the finances of the Society led the President up to a very definite appeal to the nation on behalf of chemistry, and a warning that the curtailment of its legitimate activities formed a distinct danger to the prestige of British chemistry. In 1914, he reminded us, the nation spoke to chemists in no uncertain voice. Drugs, explosives, poison gas, and other essentials were wanted, and in no single case was the chemist found wanting. The chemists had not yet spoken back to the nation, but the time had come when he thought they might do so and in the following terms:

"In 1914 you asked us to do a certain work for you. We did it to the best of our ability. We readily admit that some of that work was not forthcoming as speedily as we could have wished and in circumstances where speed was of great importance. This was due to the fact that the type of work we were asked to do was new to us and we had to gain the necessary experience. This experience has shown us clearly that in order to be prepared for any future call, where delay may prove fatal, it is necessary that nothing should be left to chance. Therefore, it is imperative for us to be able to carry out numberless researches and to keep ourselves informed about the progress of chemistry in general. Your demands in 1914 greatly stimulated research activities. The publication of an increased number of papers has become a very serious matter for the Chemical Society, which can only meet the present situation by greatly curtailing its legitimate and rightful activities. In these special circumstances won't you help us to carry on our legitimate work?"

"I cannot think, Sir," the President added, turning to Sir Frank Heath, "that such an appeal could possibly fall on deaf ears, for this very simple reason—that the Chemical Society through its members has proved itself to be a national asset of the utmost magnitude and importance."

The rest of the speaking must be dismissed more briefly than it really merits. Professor Armstrong proposed the toast of the retiring president in his own refreshing and distinctive way, and Professor Wynne briefly acknowledged the very cordial way in which references to his work were endorsed. Professor Irvine Masson gave "The Federated Societies" in a serious speech; Mr. Woolcock, in reply, was deliberately frivolous, but announced the important fact already mentioned about the progress of the Chemistry House idea. Professor Donnan, judging by the laughter around him, was obviously saying good things in proposing "The Guests," but the wave-length or something else went wrong and we missed most of them. The toast was acknowledged by Professor Ernst Cohen, of Utrecht, who is spoken of as a future president of the international union, and is clearly a man of character, and Mr. Hunter Gray, K.C., who was much less earnest than when arguing Patent law.

It was all, perhaps, a little serious and heavy for after-dinner speaking, but the fact that the evening sped away so rapidly proved it to be not dull, and when the company rose Mr. S. E. Carr, who spends so much thought in seeing that all the arrangements go through smoothly, was able to retire with a good conscience.

F. E. H.

# Proposed Protective Duty on Superphosphate

## Inquiry Opened before Board of Trade Committee

On Monday the hearing of the application of the Fertiliser Manufacturers' Association for assistance under the Safeguarding of Industries Act was begun by the Committee appointed by the Board of Trade, consisting of Sir Arthur Whinney, K.B.E., Mr. Arthur Hollins, and Sir Henry Rew. The applicants were represented by Sir Cassie Holden, whilst the only opponent, the National Farmers' Union, was represented by Mr. A. M. Trustram Eve.

Sir Cassie Holden said the Fertiliser Manufacturers' Association represented practically all the firms engaged in the trade in Great Britain manufacturing superphosphate, the only firm not in the Association being at the moment not manufacturers. It was not a selling organisation or one which controlled prices. The manufacture of a ton of superphosphate required approximately 10 cwts. of sulphuric acid, and the industry in 1913-14 absorbed about 420,000 tons of sulphuric acid, practically all of which was made by the superphosphate manufacturers in their own factories. Even in the present depressed conditions, over 260,000 tons of acid was annually required by the trade. The imported phosphate rock was mainly obtained from North Africa, although some supplies were available in the United States. The only place in the British Empire where it could be obtained was in the Nauru Islands in the Pacific, and the British Government was entitled to 42 per cent. of the output from those islands at "cost price," but owing to the existing conditions the "cost," which included very heavy sinking fund and interest charges, was above the economic limit and the material was therefore being sold largely to foreign countries, principally Japan. It was estimated that 16,500 men were engaged in the industry, and this labour, apart from the necessary chemists, was largely of an unskilled character. If the industry was not subject to the present foreign competition, it was estimated that the number of men engaged could be increased to 27,000. As an indication of the effect of foreign competition, it was mentioned that whereas the output in this country in 1913 was 800,000 tons, in 1924 the output had fallen to 525,000 tons. The only people affected by a duty were the farmers, and the effect of a 10s. per ton increase in the price would have little or no effect upon them. It would not amount to more than 3d. or 3½d. per acre per annum. He would ask a substantial duty to be imposed.

### Mr. J. C. Menzies' Evidence

Mr. John C. Menzies, President of the Fertiliser Manufacturers' Association and Director of J. & J. Cunningham, Ltd., of Leith, Dundee, and London, said his firm, in addition to being manufacturers of superphosphate, were seed crushers, oil refiners, and manufacturers of fertilisers and general agricultural requirements. As to the number likely to be employed if foreign imports were taxed it was impossible to give an exact figure, but if consumption rose to what it was in 1913 the number of men required must be at least those employed in 1913, which was estimated at 27,000. Dealing with the cost of labour on the Continent, he stated that the rate paid in Belgium and France was now about 2.45 frs. per hour, which, converted into sterling at the rate of 95 (Belgium) and 93 (France) respectively, represented 6·192d. per hour in Belgium and 6·312d. in France, whilst in the United Kingdom the rate of pay for similar labour averaged 12·3893d. The cost of manufacturing sulphuric acid was affected in the same way, and as acid entered into the manufacture of superphosphate to the extent of 50 per cent., the indirect effect of high labour charges in this country was very serious. In regard to taxation, the Belgian and French manufacturer was called upon to pay 15 per cent. of his profits and a 1 per cent. turnover tax as the only national imposts. In regard to local taxation, there was an even greater advantage. A freehold factory in Belgium capable of producing 25,000 tons of superphosphate per annum paid in the trading year 1923-4 the sum of 7,500 frs., total, for local taxation and property tax, equivalent to only £95 at the rate of 95 frs. to the £. As this factory actually produced 20,000 tons of superphosphate during the period in question, the taxation cost per ton was less than 1d., compared with 5s. 3·51d. at a London factory.

Witness then dealt with the position in regard to the supply of phosphate rock from North Africa, which, he said, was largely controlled by French superphosphate manufacturers, whilst the French Government, according to the French trade journals, was largely interesting itself with the object of bringing about a cartel of French sellers of phosphate rock in order that the French manufacturers of superphosphate may get their raw material much more cheaply than other countries.

Sir Henry Rew said that there appeared to be an agitation to form a combine in phosphate rock but nothing had yet been done. The British superphosphate manufacturers might be affected in the future if it were accomplished but they had not been so affected yet.

Asked as to alternative supplies, Mr. Menzies said that some had been bought from America, but he did not think any had been bought since control was taken off in this country.

### Effects of Prohibitive Tariff

Mr. Trustram Eve in cross-examination put it, and it was agreed, that the manufacturers of superphosphate desired a prohibitive tariff on the imported article so that they would have the whole trade in their own hands, and that it was anticipated that instead of an average price of £3 per ton the average price would be £3 10s. per ton. Assuming a prohibitive tariff were placed on imported superphosphate, did not Mr. Menzies think that the French would retaliate by putting a tariff on the phosphate rock?

Mr. Menzies said he did not contemplate that, but if so there were alternative supplies from America, and he was hoping that some day we in this country would be able to get supplies from the Nauru Islands. He agreed that the price of American phosphate rock was a little higher and that it was not the same quality as the French for making 30 per cent. superphosphate. The actual cost of the rock was not so much greater but it would have to be treated before it could be used. Moreover, if a tariff were put on the French rock, he anticipated that the British Government would come to the help of the British superphosphate manufacturers.

Mr. Trustram Eve: We can leave that sort of thing out of the inquiry.

Mr. Menzies then dealt with the decline of the superphosphate trade overseas and in the home market. To-day, he said, the export trade has ceased entirely, and he could see no chance whatever of it reviving under present conditions. Whilst in 1910 the exports to certain countries were 155,831 tons, the quantity had continually fallen until in 1923-4 the amount was only 4,777 tons. In five cases a home manufacture had been developed, including Australia, New Zealand, and South Africa. He doubted very much whether any material improvement could be effected in the export trade for some time to come. Owing to the control in this country, under which export prohibition was not lifted until September, 1921, foreign producers were able to secure the available markets and French and Belgian producers were now able so to undercut the British manufacturers—whose costs were so much higher for the reasons already given—that the opportunity which at one time existed of recovering an export demand had been, in his opinion, lost.

Mr. Trustram Eve informed the Committee that the National Farmers' Union wished to take a neutral attitude with regard to the positive case, but intended to impress upon the Committee the effect of a tariff on superphosphate on agriculture, which was the only outlet for superphosphate.

The witness agreed that any increase in cost of superphosphate could not very well be passed on to the consumer, and that a prohibitive tariff would not induce farmers to use more superphosphate.

Counsel then argued that the cost would be much higher than now and that therefore the assumption that the prices of material would remain the same as now was false, and the cost of superphosphate must be increased more than 10s. per ton as suggested. Moreover, was it not likely that if the cost of superphosphates went up the price of other phosphatic fertilisers would rise in sympathy?

Mr. Menzies said he did not think this at all likely.

At this point a discussion on procedure took place, and as Sir Cassie Holden had not had sufficient time to get the case for the manufacturers into proper form, it was decided not

to meet, as originally intended, on Tuesday, but to adjourn until Monday, April 6. It is possible that evidence may be given later by the Scottish farmers, but no appearance was made at the opening of the inquiry.

### Farmers' Opposition

Lord Beauchamp presided at a meeting of the Council of the Central and Associated Chambers of Agriculture held at Westminster on Tuesday. The business committee expressed their decided opposition to any duty being imposed on superphosphate, and recommended a witness to give evidence before the committee. Sir E. Packard said that manufacturers had lost considerable sums owing to foreign competition. Speakers said that if preference was given to these superphosphate manufacturers agriculturists would be in still greater difficulties.

# Chemical Engineers' Conference on Crushing and Grinding

*We give below a summary of the discussion on the following papers given before the Chemical Engineering Group of the Society of Chemical Industry :—" Crushers Used in the Chemical Industry," by W. T. Miller ; " Notes on Coal Crushing and Grinding Machinery," by R. J. Glinn ; " The Raymond System of Grinding and Air Separation," by C. S. Messinger ; and " Grinding Mills, with Special Reference to Rollers," by C. J. Seaman. These papers were reported in* THE CHEMICAL AGE *last week.*

Professor J. W. HINCHLEY, who opened the discussion, said that as the four papers were by manufacturers, he took it that the object of the discussion was to get the consumer's point of view. What was wanted was some definite comparison between the various types of machine from a more or less independent source, because he did not always believe what the makers said about their own machines. There were some travellers going about the country who said quite unreasonable things. The horizontal disc crusher mentioned by Mr. Miller was a very interesting machine, and one which he was not previously acquainted with, although he knew the vertical crusher. At the same time, he did not think Mr. Messinger had been quite kind to the roller mills, for he had condemned them to some extent, when he should have condemned the people who used them. Speaking for users, he knew how badly machines were treated by users in general, although the manufacturers were also very often to blame.

In regard to Mr. Seaman's paper, he was surprised to find no mention of some of the latest developments, for instance, the use of rubber linings in ball mills. This appeared likely to cause a revolution in the use of these mills in some industries, both in rough and fine grinding, because it was the lining of ball mills which gave all the trouble. From results he had seen it appeared that the use of rubber linings did not seriously affect the output, whereas with the ordinary way there were difficulties in preventing the lining getting mixed with the material being used. Then Mr. Seaman made no reference to the use of melted natural rocks such as melted basalt or melted granite, which the electric furance was putting into our hands to-day.

The workmanship in grinding mills had very much to do with the results obtained. He was very doubtful as to the value of the reciprocating roller. He disagreed with Mr. Seaman entirely in thinking that rollers should touch in the same place every time. With a helical tooth gearing it was possible to get a perfectly smooth running mill without any difficulty at all, and also avoid the clash of gearing which often occurs, although it was necessary to adjust the gears as the rollers wear. Incidentally, he regretted that there was no statement as to the amount of wear of rollers. It appeared to him that a rough estimate was $\frac{1}{8}$ in. of diameter per year running continuously, and this led him to the point that it is a great pity that manufacturers in this country did not keep more in touch with the users. Perhaps the reason why users did not help was that in the case of a first-class firm who had scientific men on their staff they so improved the apparatus after it came from the manufacturers that they did not care for this to come to the notice of the makers, but he felt that was a bad policy, and one not calculated to lead to progress.

Major K. N. SAYE disagreed with Mr. Seaman that the single roller mill would go out of use. Although the two-roller mill had its advantages, he believed that very shortly we should find it giving way to the three-roller mill.

Dr. SCHOTZ said that the user to-day was becoming very discriminating, and desired to know the exact degree of fineness he is going to get with a particular machine. The Raymond machine had many interesting features, but he did not think full justice had been done to it in the paper. As to the horizontal disc crusher, there were several such machines on the market, and it would have been interesting to have had pointed out the features in which the machine was superior to the others, and to have mentioned all the machines by name in doing so.

The CHAIRMAN reminded Dr. Schotz that there was such a thing as a law of libel, and he felt that Mr. Messinger was quite right in giving the details of his own machine and leaving it to the meeting to judge between it and others.

Mr. P. J. NEATE said he had never yet seen a crusher of the Blake or gyratory type which did not occasionally block up, and it was a failing of these types that it was an exceedingly awkward job to clear them. Could Mr. Glinn give any data respecting the grinding of wet coal, with, say, 10 per cent. of moisture, as this was claimed to be possible on some relatively new machines with a reduction or output not exceeding 33 per cent. ? He believed, however, that 7 per cent. was the advisable limit for moisture in the case of ordinary coal, and 1 to 2 per cent. for anthracite, and 10 per cent. for lignite. The ground coal could also be blown straight into the furnace from the grinder, thus saving hoppers and fire risk in the hoppers. Would Mr. Messinger say whether the air was always circulated in a closed circle in the Raymond mill, or was it sometimes cleared and discharged ? If the latter, was it really free from dust ?

Mr. W. STAPLETON asked Mr. Glinn what effect combined moisture had on dry grinding mills and what effect it had on the output and power. Also, what was the cost per ton of pulverised coal on the dry grinding mills mentioned by Mr. Glinn ?

Captain GOODWIN referred to the statement by Mr. Seaman as to the effect of temperature in grinding. He believed that it was a fact that temperature played a very considerable part in this connection, and it would have been interesting to have had some information as to the effect of variations of temperature on the power taken to grind a ton of any given material. It would be interesting also to know the general principles upon which the action of the various machines could be adjusted in order to get whatever variations might be specified in regard to the actual grading of the final product.

### The Need for Standardisation

Mr. E. KILBURN SCOTT said that at present there were roughly two methods of standardising fineness. One was that the wire was roughly the same diameter as the space between, and the other was that the wire was only one-third—i.e., the space was two-thirds, and the fact that these two methods were used led to some trouble. It was essential that we should have one standard method as quickly as possible, and it seemed to him a matter for a committee consisting of representatives, perhaps, of the Institution of Mining and Metallurgy, the Chemical Engineering Group, certainly the Institution of Mechanical Engineers, and others to arrive at a definite standard, because at present one method mentioned was used in the cement industry and the other in the phosphate industry.

Mr. W. CARR HILL asked Mr. Messinger what percentage of moisture he could deal with in a Raymond mill dealing with a 350 mesh product. Was it 2, 3, or 4 per cent. with materials such as limestone, coal or charcoal ? Mr. Messinger also spoke of 10 to 12 h.p. per ton for grinding in the mill itself, but to that must be added the power of the fan for sucking the ground material. He would therefore like to know what would be the final horse-power per ton.

Professor J. W. HINCHLEY, answering a point on the measure of fineness raised by Mr. Carr-Hill, said that it must be remembered that the conditions in the cement industry were so totally different from those in many of the chemical industries that a large proportion of 1,000-mesh material would utterly ruin the final product for some chemical operations. Therefore, he thought we should stick to the opinion that the best mill was the one which would grind to the most uniform size, and then go to the next stage of grinding.

The CHAIRMAN, in drawng the discussion to a close, referred to the statement by Mr. E. K. Scott as to the need for standardisation of mesh, and said he believed it was a matter which the British Engineering Standards Association had in hand.

Professor HINCHLEY said that was so.

### Mr. Seaman's Reply

Mr. SEAMAN said he had not mentioned rubber linings because he wanted to know more about them. He believed there were many difficulties to be overcome before we could get a perfect ball mill. He was not at all sure that the rubber lining had come to stay. He himself advocated the reciprocating machine because of satisfactory experience. Professor Hinchley was probably thinking of one particular substance—graphite—and he agreed that that could be crushed quite easily with the ordinary rolling motion. Many of the factors in grinding naturally depended upon the material dealt with. Professor Hinchley had mentioned the limit of speed. That depended upon how adhesive and cohesive the material is, and it also depended on the type of mill. There were plenty of materials with which a 15-in. roller could not be run satisfactorily over 80 r.p.m., whilst there were plenty of others with which a 15-in. diameter roller could be run very satisfactorily up to 250 r.p.m.

Mr. SEAMAN said that with pigments it was possible to get satisfactory results at much higher speeds, but the point there was that the medium in which the pigment was mixed affected the speed. As to wear, Mr. Seaman said he knew of hardly any material with which the wear on a roller would be at the rate of one-eighth of an inch per year if the roller was correctly selected. He believed, however, that one-eighth of an inch per year was about the average that was ground off an ordinary soft granite roller.

Mr. MESSINGER, replying to Dr. Schotz, referred him to the table at the end of the paper for information as to the horse-power per ton. Replying to Mr. Neate as to keeping the air in a closed circuit in the Raymond mill, he said that they tried to keep the system as closed a circuit as possible, although there was a surplus air vent which was necessary. As to the content of moisture in coal which could be dealt with in the Raymond mill, he had dealt with materials with a moisture content as high as 14 per cent., but there was an enormous reduction in capacity with the moisture content, something like 2 per cent. reduction in capacity for over 1 per cent. of moisture. In reply to Mr. Carr Hill with regard to the percentages of 600 and 1,000-mesh particles in a material supposed to pass 350 mesh, Mr. Messinger gave the results of test figures on barytes and quartz, showing the percentage of the finer particles in a 350-mesh material.

Mr. GLINN, in the course of a short reply, said that coal containing 10 per cent. moisture could be dealt with in crushers, although it depended a great deal on the class of coal. Lignite could be satisfactorily pulverised with about 10 per cent. moisture, but in the case of high volatile coals it was advisable not to go beyond 7 per cent. With the less volatile materials such as coke and anthracite it was essential to keep the moisture down to as low as 1 per cent. or 2 per cent.

Mr. MILLER said that it was very difficult to theorise exactly as to what was happening in the jaw crusher. In reply to Professor Hinchley, who had stated that he had dealt harshly with the roll crusher, Mr. Miller said that the trouble was that users in this country would very rarely pay the price for the big diameter mills which were absolutely necessary for the crushing of hard material from a good size down to a reasonable fineness. Otherwise there would be abrasion, and that was one of the reasons perhaps why the roller mills were to some extent condemned. It was difficult to avoid flanging, and, as to springs, he did not like them on rollers that were crushing hard material.

A vote of thanks was accorded the authors at the conclusion of the discussion.

## Poison Gas Research

### Experiments on Soldiers

Mr. DUNNICO (House of Commons, March 31) asked the Secretary of State for War whether, with regard to the fact that at the camp of the Chemical Warfare Research Department at Salisbury Plain experiments were being carried out to test the relative effects of poison gas on soldiers, he would say whether any men subjected to those tests had been seriously and permanently injured in their lungs and otherwise; and whether he was prepared to put a stop to such experiments?

The Secretary of State for War (Sir Laming Worthington-Evans) said that no men had suffered injury to their lungs or otherwise through being subjected to these tests. The answer to the second part of the question was in the negative.

Mr. Ammon asked the Secretary of State for War, with regard to the experiments as to the effect of poison gases on young soldiers which were conducted at the Chemical Warfare Research Department, the number of such experiments, and the number of young soldiers engaged in them, since 1918?

Sir L. Worthington-Evans said that the number was 372, and the number of soldiers engaged in them 188. All these soldiers voluntarily offered themselves for this special duty. These men received extra pay.

Mr. Ammon asked the Secretary of State for War the nature of the experiments conducted at the Chemical Warfare Research Department by subjecting young soldiers to the effects of poison gases; what precautions were taken to prevent such experiments resulting in injury to the young soldiers concerned; and the number of young soldiers who had been injured in their lungs and otherwise since 1918?

Sir L. Worthington-Evans said that the experiments fell under three categories:

(1) Exposure to low concentration of gases to ascertain their physiological properties; (2) Exposure to gas of personnel protected by respirators in order to test the protective efficiency of the respirators; (3) Tests on skin of human personnel of new compounds to ascertain their irritant action, if any.

All such experiments had been carried out under most stringent regulations, which had been framed on the best medical advice obtainable, in order that the health of the observers concerned might be safeguarded. There had been no cases in which injury to the lungs or otherwise had been caused to soldiers since 1918.

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### Bitumen for Road Construction

SPEAKING at the annual meeting of the Limmer and Trinidad Lake Asphalte Co., Ltd., held in London on Friday, March 27, the chairman, Sir Courtauld Thomson, referred to the properties of bitumen in the construction of road surfaces. Each form of road surfacing was in turn subject to criticism. There had been a tendency in some quarters to decry the advantage of asphalt. It has been suggested that asphalt was unsuitable because under certain conditions it was inclined to be slippery. Research has proved that slipperiness in asphalt pavements was due to definite and ascertainable causes which could be avoided by adequate technical control. There was a powerful propaganda in favour of concrete as a road surface. In spite, however, of special claims that were put forward in favour of this material, it is a striking fact that out of 140 miles of arterial roads around London only some 20 miles are made with a concrete surface, while the balance is laid with asphalt. He stated that in the opinion of the company, and he spoke with the full weight of unequalled experience, an elastic surface must be the ultimate solution of the road problem. Only an elastic surface could survive the pounding action of modern traffic, and in this property bitumen, particularly Trinidad bitumen, stood unchallenged.

Sir Courtauld mentioned a highly organised department which dealt with mastic asphalt generally as applied to buildings, etc. During the year 1924 their position in that department of the company's work had been more than maintained, and it was noted that the export of mastic asphalt manufactured by the company was finding favour in the Colonies and abroad generally, and the export of that material showed continual growth.

It is also satisfactory to note that in the department dealing with compressed rock asphalt, for city street paving, the company had maintained its position.

# Reviews

THE CONSTITUENTS OF COAL TAR. By Percy Edwin Spielmann. London: Longmans, Green and Co. Pp. 219. 12s. 6d.

Dr. Spielmann has collated in this book exceedingly valuable data concerning the physical constants and chemical properties of the chief constituents of coal tar—data, much of which, unfortunately, is not customarily found in the standard text-books. The result is a volume that no worker on coal tar can afford not to possess on his reference shelves. The author disclaims in the preface any intention of encyclopædia building, and consequently he has limited closely the choice of compounds described, sometimes rather too rigidly, we are inclined to think, as no data are provided for non-cyclic hydrocarbons or naphthenes, whilst to the higher pyridines in the heavy pyridine fraction but two lines are devoted on page 187. In some places, however, we have received the unfortunate impression that either Dr. Spielmann has hardly sufficiently used his critical acumen or undue haste has been exercised, and we have noted a number of slight slips and omissions.

Occasionally more important issues have been noticed. Thus, the author's comment on the fact that calcium carbonate reacts with a mixture of phenol and water is: "This is an unexpected statement, considering that carbon dioxide is a stronger acid than phenol" (p. 120). If the reader will examine the dynamics of the matter he will find that it would be distinctly unexpected if calcium carbonate did *not* thus react. Similarly, it is difficult to see why the action of cresol on sodium sulphide should be termed "curious behaviour" (p. 111), for, as we all know, hydrogen sulphide is an exceedingly weak acid, and the reaction is exactly what would be expected. Again, on page 77, from the fact that technical indene on oxidation gives a mixture of hemimellithic and trimellithic acids, the deduction is drawn that "these indicate the presence of 2 : 7- and 5 : 6- (? misprint for 3 : 6-) methylindenes and probably all four isomerides actually exist in the fraction" [the query is Dr. Spielmann's]. A chemist, working the matter out for himself, will find that this should read "4-, 7-, 5- and 6- methylindenes . . ." as indeed is specifically stated in the original paper cited (*Ber.*, 1902, **35**, 1762). Many workers on coal tar will experience in this book another difficulty—differing physical constants are often given for a compound without any indication of their relative reliability.

With these reservations we would heartily commend this volume to coal tar workers; it is the most complete short summary on the subject that has yet been published in English.

D. IVOR JAMES.

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A COMPREHENSIVE TREATISE ON INORGANIC AND THEORETICAL CHEMISTRY. By J. W. Mellor, D.Sc. Vol. V, B, Al, Ga, In, Tl, Sc, Ce, Rare Earth Metals, C (part I). London: Longmans, Green and Co., 1924. Pp. 1004. 63s.

Volume V of Dr. Mellor's tremendous undertaking fully maintains the high standard of excellence of the preceding volumes. It happens that the ground here covered includes practically nothing but pure inorganic chemistry, a short section on "adsorption" being the only interruption to the smooth flow of description of history, occurrence, preparation and properties. This volume thus offers good material for comparison with the older inorganic treatises, and it may be said at once that it in no way suffers from the comparison. A certain amount of readability is necessarily sacrificed for the sake of completeness, but there is no lack of long passages of sustained interest. Such, for example, are the historical sections on gallium, indium and thallium, and the greater part of the 216 pages devoted to the rare earths. The constantly repeated initials of the chemists cited are irritating at first, but the eye learns eventually to omit them.

The completeness of the work is amazing, and, as in previous volumes, the references extend to many pages of small print. The table of reported new elements of the rare earth family is of interest, but it is doubtful whether any useful purpose is served by recording Fittica's fancied conversion of boron into silica and Councler's disproof of the claim. The two ancient wood-cuts illustrating the extraction of boric acid in Tuscany must be familiar to every chemist and might with advantage have been replaced by modern photographs. In the chapter on carbon compounds one or two slips have been noted—the alternative formula for acetone dihydrofluoride contains only one fluorine atom; carbon suboxide "is regarded as malonic anhydride." (P. 906.)

It was of course to be expected that Dr. Mellor's sense of humour would not allow him to pass without notice the discussion as to whether calcium carbide is a fine chemical or an organic compound or neither, and the little paragraph in small print on page 860 is very much to the point even though it is not altogether unanswerable.

Two more volumes, it is anticipated, will complete the *Treatise*. It is a book of which English-speaking chemists should be proud, and which should find a place in every chemical and technical library.

C. H.

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A HISTORY OF BLEACHING. By S. H. Higgins, M.Sc. London: Longmans, Green and Co., 1924. Pp. 176. 10s. 6d.

This is an account of the development in England of machinery and methods for bleaching textile materials, the facts brought together dealing almost exclusively with the application of chlorine and bleaching powder to cotton and linen. The book is interesting and useful, the reader being pleasantly guided through two centuries and shown how the slow yet famous bleach-field and buttermilk methods of Flanders have been replaced by the rapid and superior bleaching processes practised in Lancashire to-day.

During the early part of the nineteenth century it is apparent that the English bleaching industry resembled a much flogged horse. Before the use of spinning and weaving machinery it mattered little whether bleaching occupied six days or six months, but after the mechanical inventions of Arkwright and others, bleachers were faced with an ever increasing production of yarn and fabric. The solution of this problem was largely due to the discovery of bleaching powder by Tennant in 1799 and the enterprise of James Muspratt, who commenced the manufacture of soda by the Leblanc process at Liverpool in 1828. As the use of lime, bleaching powder, sodium carbonate and caustic soda for the cleansing of textile materials was established, mechanical methods were steadily introduced and the efficiency of bleaching was gradually raised to that of to-day.

Mr. Higgins has included much information concerning those bleachers and bleaching companies who were pioneers and the story of their struggles, failures and successes makes interesting reading. The book contains no index, but the illustrations are good, particularly the striking portrait of James Muspratt, and it contains but few mistakes. On page 29 *Answorth* should be *Ainsworth*, and a few words are omitted from line 13, page 14. For thorough digestion of the contents a second reading will be found necessary, but no one will find this a disagreeable task.

A. J. HALL.

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PATENTS: INVENTION AND METHOD. By H. E. Potts, M.Sc. London: The Open Court Co. Pp. 160. 3s. 6d.

This book is a reprint of half a dozen papers by a patent agent, dealing with the nature and definition of inventions. A rough indication of the scope of these papers will be afforded by their titles, viz.:—An Application of Mathematics to Law; Prediction and Invention in Chemistry; Language and Style in Patent Law; The Logical Problem of Definition in Patent Law; Scientific Method and Patent Practice; Influence of Patent Law on the Evolution of Research.

Of these papers, those who are engaged in the chemical industry will undoubtedly find their greatest interest in the second and the sixth. In these chapters the author gives some very interesting particulars to show the nature of invention in chemistry, and the way in which it differs from mechanical invention. As he rightly points out, the standard of patentable invention is much lower than is commonly believed, and practically any improvement that is worth adopting in the works is patentable, provided only that it is novel. The author discusses some of the leading court cases affecting chemical inventions in a very clear and helpful manner.

In one of his papers the author develops the argument that it is possible to make inventions "to order" by the application of scientific principles and methods. This, of course, is only what is continuously being done by systematic research, and some very helpful guidance is given as to the lines upon which a given problem should be attacked. The problem of obtaining

the maximum patent protection for an invention, quite as important a matter as the invention itself, is fully discussed.

The chapters on the application of mathematics to patent law and on language and style are perhaps of more academic interest to the chemist, but will be found of value by the student of patent law. F.

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A Textbook of Glass Technology. By F. W. Hodkin, B.Sc., A.I.C., and A. Cousen, M.Sc., A.R.C.Sc., A.I.C. London: Constable and Co., Ltd., 1925. Pp. xxiii, 551; 251 figs. 42s.

Since the formation some ten years ago the Department of Glass Technology of the University of Sheffield has rendered signal service in many ways to the glass industry throughout the world, and its latest contribution is a textbook upon the technology of glass written by two eminent members of the staff of the Department. The need for such a textbook has long been apparent, and its appearance will be welcomed by everyone interested in glass no matter in what direction their interests may lie. The authors must be congratulated upon the production of a work which will remain a classic of its kind. Its arrangement is admirable, and a particularly useful feature is the wealth of diagrams and photographs. The subject matter covers the whole domain of glass production and the amount of detailed knowledge is remarkable. The authors are never verbose; in fact, one could wish that they had enlarged some of the sections. For example, the chapters upon "Clays" would have been rendered even more valuable by a fuller reference to the "Osmosis" method of purification (p. 304), and to the vacuum casting of pots (p. 316).

It is inevitable in a book of this description that the reader will not always see eye to eye with the authors upon matters of opinion, but this fact serves rather to enhance the value of the work as it opens up new vistas of thought. The statement upon p. 487, for example, that in deference to public opinion manufacturers of optical instruments will not use a lens containing bubble must be taken *cum grano salis*. The best lenses contain dense barium crown glasses, and this glass is seldom free from bubble. The public knowing this, far from demanding a bubble-free lens, at one time were prone to regard with suspicion a lens which did not contain some bubble. In prisms bubbles are anathema, but they are tolerated in lenses when they are small and few in number.

C. J. P.

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Synthetic Organic Compounds. By Dr. S. P. Schotz. London: Ernest Benn, Ltd. Pp. 412. 45s.

We are living in the age of synthetic chemistry. Natural products are slowly but surely being superseded by those manufactured in the factory and laboratory. The importance of this phase of chemistry is attested by the growing volume of text-book literature dealing with organic synthesis in its various aspects. In his book on synthetic organic compounds Dr. Schotz has filled a gap in our technical literature with no little distinction.

The book is essentially a practical one and covers a very wide field. As he explains in the preface, the author has adopted the popular and very elastic meaning of the word "synthetic"—*i.e.*, the antithesis of "natural." Thus there are detailed descriptions of the manufacture of such widely different products as artificial silks, resins, tannins, and perfumes. In many cases the author has proceeded on the selective principle, giving the veriest minutiæ of the actual and suggested manufacturing methods of the more important products instead of attempting the well-nigh impossible task of surveying the whole gamut. For example, the information relating to synthetic camphor, saccharin, phenol, picric acid and T.N.T. is as comprehensive and detailed as one could wish. An excellent account of artificial resins and plastics occupies 72 pages, the section dealing with celluloid being particularly lucid. Amongst a mass of other information space has been found for a description of the technical production of hydrogen and formaldehyde, catalytic hydrogenation, gas stripping and the use of absorbents. The author shows his personal acquaintance with much of the work and is at times refreshingly frank and critical. In addition opportunities for theoretical discussion have not been neglected.

The subject matter is well arranged and the large number of excellent diagrams and photographs is a prominent feature. The whole volume reflects the greatest credit on both author and publishers alike, and is a worthy addition to Messrs. Benn's series of technical chemical monographs. H. M. B.

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The Rare Earths. By S. I. Levy, M.A., Ph.D., F.I.C. Second Edition. London: Edward Arnold and Co. 1924. Pp. 362. 18s. net.

This book gives a general but fairly comprehensive account of the rare earth group. In the first edition a description of titanium was included, but that has now been omitted on the ground that titanium is not a member of the group and that several adequate descriptions of it have since appeared elsewhere. Discussions of thorium and zirconium are still included, although it is recognised that these also do not properly belong to the group. The value of the book would certainly be greatly reduced if the portions relating to thorium and zirconium were excluded. The chapter on "The Radioactivity of the Minerals" has been completely rewritten and the other chapters have all been revised.

Commencing with a chapter on the nature of the mineral in which the rare earths are found the author proceeds to discuss the silicates and titanates of the rare earths, then the tantalo-niobates, the oxides and carbonates, and the phosphates and halides. The chapter on the monazite sands, which are of so much interest to manufacturers of mantles for incandescent gas lighting, contains much useful information relating to the distribution of the sands in different parts of the world and the methods employed for concentration of the monazite in the sands. The method of obtaining thorium nitrate by chemical treatment of the monazite is described in a later chapter. The final portion of the book deals mainly with the manufacture of mantles from cotton, ramie and artificial silk, with a concluding chapter on the technological uses of cerium, yttrium, zirconium and thorium apart from mantle manufacture.

The book contains a large amount of information concerning elements and their compounds which receive only scanty notice in most text books on chemistry. It is well written and well printed. H. F. H.

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Elementary Qualitative and Volumetric Analysis, Inorganic and Organic. By William Caldwell, M.A., Sc.D., with an Introduction by C. S. Gibson, O.B.E., M.A., M.Sc., F.I.C. London: J. and A. Churchill. 1924. Pp. 418. 10s. 6d. net.

This book is intended primarily for use in medical, pharmaceutical and dental schools. Some idea of the wide ground it covers may be formed from the titles of the four sections into which it is divided. The sections are:—Part I, elementary inorganic analysis; Part II, the reactions of the more commonly occurring acid radicles. Part III, the reactions of the more commonly occurring organic substances Part IV, elementary volumetric analysis.

Although the author retains the use of the term "acid radicle," which has been displaced in some modern books by the word "anion," the book does not overlook or reject modern theories, and the subject of ionisation receives ample consideration.

The reactions of a large number of organic substances are given in the organic section. These include alcohol, ether, phenol, urea, several of the alkaloids and carbohydrates, and finally albumin. A scheme is given for the detection of the organic substances mentioned in the syllabus for the pre-medical examination of the Conjoint Board. The whole book is, in fact, especially designed to meet the requirements of students who are preparing for the pre-medical examination in practical chemistry of the Conjoint Board of the Royal College of Surgeons of England and the Royal College of Physicians of London.

Both author and publishers may be congratulated upon the issue of a very useful and attractive book at a moderate price. H. F. H.

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### Recent Wills

Mr. James Edward Bedford, of Headingley, Leeds, manufacturing chemist, a director of the Yorkshire Dyeware and Chemical Co., Ltd..... £54,519

Mr. Robert Hellon, of Seascale, Cumberland, leather trade chemist ..... £28,986

# Gas Companies and Chemical Manufactures

## Alkali Association Opposes Gas Light and Coke Bill

THE Alkali Manufacturers' Association appeared before a House of Commons Committee on Thursday, March 26, in opposition to the Bill of the Gas Light and Coke Company, which proposed to acquire the undertaking of the Brentford Gas Company. The Bill sought, among other things, to repeal section 37 (2) of the Brentford Gas Order of 1924, which is as follows :—

" The Brentford Company may also :—

" (A) purchase the residual products arising from the manufacture of gas by other gas undertakers and (on any lands upon which the Brentford Company are for the time being authorised to work up and convert their own residual products) work up and convert such purchased residual products and therewith manufacture other products of the same kind as the Brentford Company are manufacturing from their own residual products. Provided that the quality of any residual product so purchased by the Brentford Company in any year shall not exceed one-third of the quantity of the like residual product which shall in the year arise directly or indirectly from the manufacture of gas by them ; and

" (B) purchase from other gas undertakings and elsewhere and use the materials required to work up and convert the residual products so arising from their own manufacture of gas or purchased as aforesaid ;

" But the Brentford Company shall not manufacture chemicals exclusively from raw materials purchased from sources other than gas undertakings, or in the manufacture of which the use of residual products produced by the Brentford Company or purchased from other gas undertakings is merely subsidiary."

The Gas Light and Coke Company has no such clause imposed upon it by its various Acts of Parliament, and does not wish these restrictions to be applied to it in respect of the Brentford undertakings when it is acquired. It was stated for the Gas Light and Coke Company that it did not want power to purchase residuals from anybody else because it was not their practice to buy residuals from other undertakings.

### The Company's Position

Mr. H. B. MACMILLAN, K.C., for the Gas Light and Coke Company, speaking of the controversy which had existed as to whether it was right and proper for gas undertakings to buy residuals from other gas undertakings, said that the operations of gas undertakings had been very jealously watched by the heavy chemical trade, who considered that the gas undertakings were to some extent poaching on their preserves, because they were dealing with the working up of materials into marketable products, which was also part of the business of the heavy chemical trade. The genesis of this practice of purchasing residuals not produced in the undertaking itself was that in small works it did not pay to set up a plant to work up these residuals and to dispose of them, and the practice had grown of collecting residuals from a number of gas plants. Exception was taken by the Alkali Manufacturers' Association to any gas undertaking handling more than its own residuals. The Association had sought to have every undertaking working in a watertight compartment. That was a very serious restriction upon small undertakings, and, in effect, would have prevented them from disposing economically of their residuals. A joint Committee of both Houses of Parliament, in 1912, recommended that where power was given to purchase residuals from other gas undertakers, that power should be limited to one-third of the amount produced by the purchasing undertaker. That restriction was placed upon the Brentford Company under its Order of 1924. Why the Alkali Manufacturers' Association wanted that power retained by the Gas Light Company in so far as the Brentford area was concerned he did not know. The Gas Light Company had not that power in its present area, and was a gas company which minded its own business and was self-contained within its own four walls in this matter. For some mysterious reason the Alkali Manufacturers' Association was trying to force upon the company a power it did not want, but it was not the practice of Parliament to do that.

### Mr. D. Milne-Watson's Evidence

Mr. D. MILNE-WATSON (Governor of the Gas Light and Coke Company) said the company had no wish to purchase residuals from outside, as they had already sufficient supplies of their own.

Asked by a member of the Committee how the company would be embarrassed if they had the power but did not use it, Mr. Milne-Watson stated that if the company accepted the clause it would have the effect of reducing their powers in another direction. The proviso which would preclude the company from manufacturing chemicals exclusively from raw materials purchased from sources other than gas undertakings, would prevent the company from manufacturing caustic soda used for working up their residuals.

Replying to Mr. Craig-Henderson, K.C., who cross-examined, the witness agreed that the company had power to purchase materials for working up their own residuals elsewhere than from other gas undertakings, and he wished to retain that power.

### Alkali Manufacturers' Case

Mr. CRAIG-HENDERSON, K.C., for the Alkali Manufacturers' Association, said that the Gas Light and Coke Company had been fortunate enough to obtain powers of a fairly wide character, which had enabled it to carry on a pretty extensive manufacture of chemicals for converting its own residual products. If the company were coming to Parliament for the first time in order to get powers, it would not be in the happy position it was in in 1868, when it was first formed. It would have to face the fact that ever since 1912 there had been followed the declared policy of Parliament that restrictions had been placed upon gas companies so that, being protected under a statutory monopoly and having great advantages with regard to the supply of gas, they should not at the same time become competitors with other people outside who had not a monopoly of that character. Only a year ago the Brentford Company had absorbed the Harrow and the Richmond Companies, and, as the result of opposition by the Alkali Manufacturers' Association, the Brentford Company had had imposed upon it the model clause. Within twelve months the Gas Light and Coke Company came to Parliament for sanction to an agreement to absorb the Brentford Company, and, having obtained its powers under an old Act, had asked that it should be given the Brentford area free of the restrictions which Parliament had imposed upon it. Why should Parliament do that ? Why could not the Gas Light and Coke Company take the Brentford area as it was ? It was said that the company had no power to purchase residuals from other gas undertakers except for the purpose of converting their own residuals, but that was a very wide power. The company's gas output and output of residuals was enormous, and it had a huge chemical undertaking quite apart from gas supply. If there was any difficulty in working one part of the amalgamated area with another, that was a very good reason for not allowing the amalgamation. He asked the Committee to say that, if the Gas Light and Coke Company were to take the Brentford undertaking, they should take it with its limitations.

After deliberating in private, the Committee decided to pass the preamble of the Bill, and not to give the Alkali Manufacturers' Association what it asked for.

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## Non-Skid Road for Trolley-Buses

THE reconstruction of North Street, Wolverhampton, with concrete has just been completed. The approximate length is 155 yards and the width ten yards. Mr. Green, the borough surveyor, and Mr. Robinson, the deputy surveyor, who were responsible for carrying out the work, recommended the construction of a concrete road on account of its non-skidding qualities. This is an especially important factor at Wolverhampton, because it has a service of trolley-buses, and side-slipping by these vehicles would cause a severance in the connection between the trolley and the wire.

The concrete is 7 in. in thickness in two courses, the top course being between 2 and 3 in. thick. For reinforcement the British Reinforced Concrete and Engineering Co.'s No. 9 was placed 2 in. from the bottom, and in order to enable this central street, which is near the Town Hall, to be used in the shortest possible time, ferrocrete was the cement used in the making of the concrete.

## The British Association of Chemists

### Professional Etiquette

It is an aim of the Association to foster in the profession of chemistry a form of *esprit de corps* that shall be as strong as that of the medical profession. Since a large majority of medical practitioners are in private practice, there is in this profession a natural trend towards unity which the profession of chemistry does not find ready made; but, despite this, it is not the less our opinion that unity is impossible without *esprit de corps*, and that therefore it is absolutely necessary to the welfare of the profession.

Professional etiquette eludes exact definition at every turn, and the explanation is not far to seek when we consider that it has its roots set in principles that lie deeper than those which are concerned with material gain. There is, in the professions of law and medicine, a real bond of brotherhood between each individual. The result of this bond has been the material elevation of these professions, but this result would never have been brought about had there not first existed a strong urge towards unity, the origin of which is not to be discovered in motives of material gain alone.

That the chemist is deficient in natural *esprit de corps* is a fact which it is unfortunately very difficult to deny. There is no organisation of chemists that for strength is in any way comparable with the British Medical Association. Chemists rarely, if ever, speak with a united voice upon any administrative question; and there seems in some quarters to exist a spirit of jealous rivalry which all who have the welfare of the profession at heart ought to deplore and denounce.

But the existence of the Association is proof of the fact that the profession of chemistry is not completely bankrupt in this respect. Materially speaking, it has been able to do much for its members, but it is not the less true that it could not continue to exist if its members were not bound together by a common ideal of professional fellowship. In this sense the Association differs from the older societies, whose aims, admirable though they are, are sharply defined, and confined within a particular sphere. The Association, whose very foundations rest upon the sense of professional fellowship, must ever remain sensitive to the least breath of changing opinion, and ever be ready to adapt itself to changing conditions.

We would earnestly appeal to all qualified chemists to support the Association. It has been shown that, besides the material benefits that membership is able to confer, an increasingly strong membership will show that the profession of chemistry is beginning to realise itself, and therefore to strive towards a spiritual and material solidarity. We do not hesitate to assert that membership of the Association is a duty that no chemist who has the welfare of his profession at heart ought to set aside. The Association ought to correspond in strength and influence to the British Medical Association, for until this end is attained the profession of chemistry cannot occupy that position which its dignity and importance deserves.

H. T. F. R.

## Reducing Oxygen Costs

At the annual general meeting of Liquid Air, Ltd., held in London on Tuesday, Mr. O. Simonis (chairman and managing director) said that subsidiary companies had been formed in Southampton, Belfast, Dundee, Birkenhead, and in the Midlands. The company produced practically everything sold or used in this country by oxygen consumers, and if they had wrested an industry from France and Germany, which until lately were the only countries producing oxygen plants, then he said so much the more credit to them.

We had heard a good deal recently about an order for five big motor ships having been given to Germany. The German shipyard, as well as the steel works behind the yard, had their oxygen plant, and that meant that they would have oxygen at something between 12s. and 16s. per 1,000 cubic feet. In this country there were only two yards which had during the last six months acquired an oxygen plant, and therefore also had oxygen at cost. These were Dundee and Birkenhead. Before they had these plants the Dundee yard paid over 50s. per 1,000 cubic feet delivered, and the Birkenhead yard over 40s. per 1,000 cubic feet delivered.

## Society of Glass Technology

### Papers at Newcastle Meeting

A meeting of the Society of Glass Technology was held in Armstrong College, Newcastle-upon-Tyne, on March 18, the President (Col. S. C. Halse) in the chair. Two papers were presented. The first was entitled: "The Use of Zirconia in Glass Making and the Characteristics which this Substance Imparts," by Violet Dimbleby, B.Sc., S. English, M.Sc., Edith M. Firth, B.Sc., F. W. Hodkin, B.Sc., and Prof. W. E. S. Turner, D.Sc. (all of the Department of Glass Technology, The University, Sheffield).

### Zirconia in Glass Making

Prof. Turner, who gave this paper, referred to the statement by Arnold in 1918 that zirconia had a very low coefficient of thermal expansion, namely, 8·4 by $10^{-7}$, only little more than that of fused silica. By analogy with the influence of silica in glass, it might be expected that zirconia would reduce the thermal expansion of glasses and assist in the production of glasses of enhanced thermal endurance. Another reason for investigaing the use of zirconia was the possibility of making glass distinctly more durable and resistant to alkaline solutions. Zirconia was also being proposed for use as a refractory material, and had in fact been employed experimentally for very high temperatures. In recent years it had been advocated as a medium for making opal glasses and enamels, but in the experiments carried out at Sheffield it was found that soda-lime-zirconia-silica glasses and soda-zirconia-silica glasses could be prepared with a considerable zirconia content. In the series of general formula $6SiO_2$ (2-x) $Na_2O$, x $ZrO_2$, 10 per cent., and in the series (6-x) $SiO_2$, $2Na_2O$, x $ZrO_2$, 20 per cent. of zirconia was introduced without producing opacity. The glasses containing considerable amounts of zirconia were difficult to melt and were viscous like alumina glasses, but with a shorter working range than the latter. The zirconia glasses did not exhibit low thermal expansion. Their annealing temperatures increased with zirconia content less steeply than corresponding glasses with basic oxides such as lime or magnesia. Replacement of silica by zirconia very considerably enhanced the resistance of the glasses towards attack by alkaline solutions.

### Viscosity Problem

The second paper was on "The Effect of Composition on the Viscosity of Glass, Part III. Soda-Lime-Magnesia Glasses and Soda-Lime-Alumina Glasses," by S. English, M.Sc. Mr. English described experiments he had carried out with a view to investigating the effect on the viscosity of glass of the substitution of alumina and of magnesia at various temperatures between 1400° C. and the annealing temperatures of the glasses produced by substitution. As a starting point a glass of the molecular composition $1{\cdot}2Na_2O,0.8CaO,6SiO_2$ was taken and the lime was substituted by magnesia in molecular proportions, 0·1 mol. being sustituted at each stage. Throughout the whole range of temperature from 1400° to below 600°, the replacement of lime by magnesia was accompanied by a reduction in viscosity, a minimum value being indicated for glasses containing approximately equimolecular proportions of the two bases. A further important feature that was evident from the curves in which the logarithm of the viscosity was plotted against composition for this series of glasses, was that the substitution of magnesia caused the rate of increase of viscosity with falling temperature to become more uniform throughout the whole range of temperature. In the series of glasses in which alumina was substituted molecularly for lime, the viscosity of the melts at 1400° showed increased viscosity, the increase being practically proportional to the molecular proportion of alumina both at 1400° and at 1200°. Below 1200° the substitution of 0·1 lime by 0·1 magnesia caused a decreased viscosity so that at 1000° and 800° there was a distinct minimum value on the viscosity composition curve. Like magnesia, alumina had a pronounced affect in rendering the rate of increase of viscosity with falling temperature more uniform.

## New Artificial Silk Prospects

The directors of the British Artificial Silk Co., Ltd., the prospectus of which was published last week and attracted considerable notice, include Mr. Gilbert Stafford Allen, chemical manufacturer, and Mr. Hugh Griffiths, chemical engineer.

# From Week to Week

TO PRODUCE SYNTHETIC PETROL from lignite coke a company has been floated in France with a nominal capital of 500,000 fr.

A NEW SODA FACTORY is being erected at Szechuan, China, with a capital of $90,000. Certain acids and table salt will also be produced.

A REPORT FROM India states that the Council of State has passed an amendment restoring the salt tax, which had been reduced by 4 annas, to 1 rupee 4 annas.

LONDON UNIVERSITY has awarded a Keddey Fletcher-Warr Studentship, of the value of £200 a year for three years, to Mr. D. C. Harrison (King's College), for research in biochemistry.

BUYERS FROM ABROAD now in London include Mr. R. W. H. Mellor, of Ocklefords, Ltd., manufacturing chemists, Brisbane. He may be addressed c/o H. B. Sleeman and Co., 84, Leadenhall Street, London, E.C.3.

THE SUPERIORITY OF BRITISH PAINTS is the subject of a letter from the Federation of British Industries to the architectural associations and to the railways. This representation arises out of the fact that large figures are shown by foreign paint imports.

RECENT CONTRIBUTIONS to the special fund being raised for the Imperial College of Tropical Agriculture include: Chilean Nitrate Committee, 250 guineas; Lever Brothers, Ltd., £200; Nobel Industries, Ltd., and Tate and Lyle, Ltd., 100 guineas each.

EXPORTERS INTERESTED IN TRADE WITH NORWAY are invited to apply for an interview with the Commercial Secretary to the British Legation at Oslo in London from April 6 to 9 inclusive. Write quoting Reference 5660 T.G. to the Dept. of Overseas Trade, 35, Old Queen Street, London, S.W.1.

THE COUNCIL OF THE UNIVERSITY COLLEGE, LEICESTER, have appointed Dr. L. Hunter, M.Sc. (Lond.), Ph.D. (Lond.), at present Lecturer in Chemistry at University College of North Wales, Bangor, to be Lecturer in Chemistry, and Mr. A. C. Menzies, M.A. (Cantab.), at present Lecturer in Physics at Leeds University, to be Lecturer in Physics. The appointments take effect in October.

SIR ALFRED MOND emphasised the importance of scientific research to industry in a speech given to the British Research Association for the woollen and worsted industries, at Leeds, on Friday, March 27. No one, he said, could say that even the most remote scientific idea might not be valuable to industry. Firms and industries that did not look to the scientist for help would disappear.

JUDGMENT WAS RESERVED on Thursday, March 26, in the motion, by the British Oxygen Co., Ltd., against Liquid Air, Ltd., to restrain the defendants until trial or further order from publishing, printing, circulating, exhibiting, or parting with otherwise than to the plaintiffs a certain commercial letter. The case has been reported from time to time in THE CHEMICAL AGE under the title "Alleged Improper Use of Letter."

A SPECIAL INQUIRY was opened by the Scottish Board of Health in the Sheriff Court-house, Aberdeen, on Monday, into the appeal to them by Mr. John Spencer, oil manufacturer, Albert Quay, Aberdeen, against the action of the Aberdeen Town Council in not giving sanction to the establishment of the business of fish-meal manufacturer in premises proposed to be erected at Point Law, Aberdeen. The main evidence centred round the question as to whether under certain conditions a fish-meal works could function without nuisance. The hearing was adjourned.

REPORTS STATE that the Government on Tuesday will move the suspension of the operations of the Reparations Recovery Act. This will facilitate the settlement of the difficulty of the 26 per cent. levy, which is an obstacle to our commercial treaty with Germany. It is now stated to be as good as settled, subject to the approval of the Reparation Commission, that the 26 per cent. levy on German exports to this country (that is, as a levy on each individual transaction) shall be abandoned. Instead, a monthly sum in sterling, covering all the transactions in a lump, is to be paid to the British Government by the German Government.

THE RETIREMENT IS ANNOUNCED of Mr. Timothy Winstanley, chief timekeeper to Brunner, Mond and Co., in whose employ he has been for over forty years.

FIRE damaged the premises of the Handsworth Firelighter Manufacturing Co. and Gibbs Oil Products Co., at West Bromwich, on Tuesday. A vat of chemicals ignited.

A COMPLETE SOAP MANUFACTURING PLANT has been installed in the Chemistry Department of the College of the City of New York to train students in actual plant processes.

DR. S. P. SCHOTZ, whose recent work on "Synthetic Organic Compounds" has been so well received, is now engaged on a volume on "Synthetic Rubber" to be published by Ernest Benn, Ltd.

SIR JOHN RUSSELL, F.R.S., director of the Rothamsted Experiment Station, has been elected a corresponding member of the Académie des Sciences, in place of Professor Winogradsky, who has been elected a foreign associate.

MR. H. T. TIZARD, principal assistant secretary of the Department of Scientific and Industrial Research, has been appointed by the Air Ministry a member of the special subcommittee of the Aeronautical Research Committee. It is to act as a co-ordinating technical body on airships.

ITALY'S PROGRESS IN INDUSTRIAL CHEMISTRY will be illustrated at the National Exhibition of Chemistry, to be held at Turin shortly. There will be sections devoted to electro-metallurgy; production of nitrogen from the air; artificial silk, and the application of chemistry to paper-making.

THE BOARD OF TRADE has revised its "memorandum relating to the carriage of dangerous goods and explosives in ships." The aim of the revision has been to show clearly and concisely the Board's requirements as to the stowage and packing of explosives and other dangerous goods carried by sea.

PORT SUNLIGHT FIRE BRIGADE on Friday, March 27, subdued a fire in an oil mill warehouse belonging to Lever Brothers, after thirty-six hours' continuous struggle. The outbreak was discovered at two a.m. on the previous day, and stacks of copra, cakemeal, and other material were destroyed.

AT THE ANNUAL MEETING of the Bristol and South-West Counties Section of the Institute of Chemistry, held last week, Mr. G. P. Davies, M.Sc., was awarded the Certificate of Associateship. The following officers were appointed:—Chairman, Sir Ernest Cook; hon. secretary and treasurer, Mr. A. W. M. Wintle; committee—Dr. G. H. Christie, Sir Ernest H. Cook, Dr. D. Hooper, Mr. R. P. Littler, Dr. E. Vanstone and Mr. F. Southerden.

MR. G. S. W. MARLOW, assistant secretary of the Institute of Chemistry, addressed a meeting of the Free State Section of the Institute of Dublin on Tuesday, March 24, on the subject of chemical appointments and contracts. He outlined the possibilities for the young chemist and incidentally mentioned that the percentage of members of the Institute without employment was now only 3½ per cent.

MR. E. B. R. PRIDEAUX, F.I.C., delivered the Sir Jesse Boot Foundation lecture at Nottingham on Friday, March 27. His subject was "Evolution in the Chemical Industry," and he dealt mainly with alkalis and soaps. With regard to alkalis, the electrolytic process of obtaining soda and chlorine from salt was of much account, but the lecturer expressed the opinion that it had not wholly replaced the ammonia-soda process in industry.

DR. R. LESSING addressed the Birmingham and Midland Section of the Society of Chemical Industry on Tuesday, on "The Inorganic Constituents of Coal." He referred to a new proposal he had made for the mining of coal by chemical means. This was done by drilling bore holes into the coal face and passing sulphur dioxide into them, whereby the coal was loosened, and could be obtained without explosives. With regard to the composition of coal ash, he said he found that the ash influenced carbonisation to a remarkable degree, so that it was possible to regulate the yield of coke and tar from any coal at will. This foreshadowed great advances in connection with gas and coke making. At the annual meeting of the section, Dr. Twiss was elected chairman; Professor G. T. Morgan and Messrs. Calder and Collis, vice-chairmen; and Mr. G. King, hon. secretary and treasurer.

### A Question of War-Time Shipments

IN the King's Bench Division, on Friday March 27, Mr. Justice Finlay heard a claim by the Controller of the Clearing Office against Andrew Weir and Co., merchants, of London and Scotland, for £15,540 7s. 9d., as a sum due to an enemy national under joint decisions of the British and German Clearing Offices. The money represented interest on a larger sum, £48,000, the price of a large quantity of nitrate of soda which Andrew Weir and Co. purchased from a German firm in 1913 and resold in South Africa.

The Attorney General (Sir Douglas Hogg), for plaintiff, said that the terms of the contract under which the nitrate of soda was bought provided that Weir and Co. were to provide the ships for the reception of the nitrate in South America, and that payment should be made in London and that the bills of lading should be taken up in 90 days by Weir and Co., or earlier, should the ships arrive earlier. The sellers retained bills of lading as a lien against the receipt of the purchase price. Everything happened according to plan, except that the war broke out before the ships arrived at Cape Town and before the bills of lading were presented, but defendants arranged for the goods to be delivered to the sub-buyers, who paid for them, £48,000, which sum the defendants subsequently paid to the Clearing Office, but without admitting any sum was due.

For the defence, Sir Leslie Scott, K.C., contended that the defendants never became debtors within the meaning of the Peace Treaty. The contract was dissolved on the outbreak of the war, and the documents could not be presented after the war broke out as that would have been a trading with the enemy.

Giving judgment for the plaintiff, Mr. Justice Finlay said the matter was one for decision under the machinery set up by the Peace Treaty, and if defendants did not choose their right to appeal under its provisions the matter was at an end, and the Clearing Offices' joint decisions must stand, and they were not open to review elsewhere. He, therefore, gave judgment for the plaintiff for the sum claimed with costs. He granted defendants a stay.

### Obituary

MR. GEORGE ARTHUR KNOWLES, chemical manufacturer of Llantarnam, Mon., a well-known figure in the chemical industry, completed his education at Cambridge and commenced his business career with Bellis and Morcom, engineers, Birmingham, and later became associated with Chance and Hunt, Ltd., chemical manufacturers, of Oldbury and Wednesbury. In 1911 he joined the Cwmbran Chemical Co. and became manager, and afterwards managing director. He was a member of the governing body of the Sulphuric Acid Association, and served on several of its committees, a vice-president of the Chemical Employers' Federation and representative on the executive of the West of England and South Wales section, and a member of the Chemical Trade Joint Industrial Council. At the funeral, the boards and staff of Chance and Hunt, Ltd., and the Cwmbran Chemical Co., Ltd., were represented, also Brunner, Mond and Co. and the Chemical Employers' Federation.

COUNT FLORESTANO DE LARDEREL, owner of the borax deposits at Larderello, which were first developed by him and later by his son-in-law, Prince Ginori Conti.

MR. G. LINKLATER, director and secretary of Walter Scott, Ltd., steel manufacturers, of Newcastle, and a director of the Leeds Phosphate Works, Ltd.

### Chemical Engineering Group

A MEETING of the Chemical Engineering Group and the Birmingham Section of the Society of Chemical Industry will take place on Tuesday, April 7, 1925, at the White Horse Hotel, Congreve Street, Birmingham, at 7.30 p.m. The subject for discussion is "Hand *v.* Mechanical Burners for Sulphur-containing Materials," and the principal paper will be contributed by Mr. P. Parrish on "The Combustion of Sulphur-containing Materials in Hand and Mechanical Burners." Other papers will be (1) "Notes on Mechanical Burners," by Mr. J. Harris; (2) "The Design and Working of Burners for Sulphur Materials," by Mr. G. A. Smy.

A visit has been arranged to the works of Kynoch's, Ltd., on the afternoon preceding the meeting.

## Chemical Matters in Parliament

### Trade Facilities Act (Russia)

The President of the Board of Trade (House of Commons, March 23), in reply to a question, stated that he was not aware that a very considerable amount of business was being lost by traders and manufacturers in this country owing to the exclusion of Russia from the Overseas Trade and Trade Facilities Act; and that he would not take steps immediately to have the embargo removed.

### Safeguarding of Industries Act

The President of the Board of Trade (House of Commons, March 24) asked if he could give the name of the firm stated by him to be manufacturing over 1,000 of the chemicals scheduled under Part I of the Safeguarding of Industries Act, 1921, said that this firm was the British Drug Houses.

### Food Preservatives

Sir Kingsley Wood (House of Commons, March 25), in reply to a question, said that the effect of the Regulations, as drafted, was that all coal-tar colours which were not included in the Schedule might be used in food until they were shown to be injurious to health. Although lead and arsenic were occasionally present in coal-tar products, he understood that the percentage of those substances liable to be introduced into foodstuffs through this medium was so minute that it was unnecessary to extend the scope of the Regulations in the direction suggested. They had received protests and assents.

### Lead Poisoning in Potteries

Sir W. Joynson-Hicks (House of Commons, March 26) said that there has been a small increase in these cases each year, the figures for the four years 1921 to 1924 being 35, 42, 44 and 47. Out of the total of 168 cases, five were cases of girls of 20 years of age or under, but only one of these was severe, and during the years in question there were only four severe cases altogether among workers who had not been employed in the potteries before the present regulations came into force. It was not possible to account with certainty for these isolated cases, but he was advised that they were probably due to a peculiar susceptibility on the part of the worker. The cases were widely distributed. Out of 112 firms concerned, five had four cases, nine had three cases, 23 had two cases and 75 had one case each.

### British Celanese Factory Conditions

Mr. Oliver (House of Commons, March 30) asked the Home Secretary whether he was aware of the very unhealthy conditions under which persons were employed by the British Celanese Co., Ltd., Spondon, through the noxious fumes arising from the acetone used in the manufacture of artificial silk, where doors and windows were closed and curtained; that, owing to this lack of ventilation, violent sickness was caused among the operatives, bringing on a complaint known as acetone gastritis, affecting no less than 20 per cent. of the men in the week ending March 7.

Sir W. Joynson-Hicks said that it appeared from the reports from the Factory Department that the conditions at these works were already being carefully investigated. Everything necessary would be done to safeguard the health of the workers.

### The Superphosphate Inquiry

Mr. Fenby (House of Commons, March 31) asked the President of the Board of Trade if he was aware that superphosphate was a necessary raw material of the agricultural industry; if he could state the amount of this commodity imported during last year; and on which of the grounds set out in the instructions to committees under the terms of the White Paper of February 3, 1925, the Fertiliser Manufacturers' Association were able to make out a *prima facie* case for investigation?

Sir P. Cunliffe-Lister said that he was aware of the importance of the commodity to agriculture, and he understood that the Committee of Inquiry was to take evidence from the National Farmers' Union as representing that industry. The imports of superphosphate in 1924 amounted to 115,744 tons. The applicants fulfilled all the conditions necessary under the White Paper for establishing a *prima facie* case.

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RESINS.—The Albertols. J. H. Frydlender. *Rev. Prod. Chim.*, March 15, 1925, pp. 145–150.

METHYL ALCOHOL.—The industrial production of methyl alcohol by catalytic synthesis under pressure. G. Patart. *Bull. Soc. d'Encour*, February, 1925, pp. 141–173.

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RARE EARTHS.—The preparation of pure yttrium oxide. W. Prandtl. *Z. anorg. u. allg. Chem.*, March 7, 1925, pp. 277–284.

HYDROGENATION.—Catalytic hydrogenation of inorganic substances. H. Gall and W. Manchot. *Ber.*, March 11, 1925, pp. 482–485.

The rôle of oxygen in catalytic hydrogenation with platinum. E. Waldschmidt-Leitz and F. Seitz. *Ber.*, March 11, 1925, pp. 563–566.

Apparatus for fat hardening. Part IV. W. Normann. *Chem. Apparatur*, February 25, 1925, pp. 34–36.

DEHYDROGENATION.—Dehydrogenation and autoxidation, their relation to each other. W. Manchot and H. Gall. *Ber.*, March 11, 1925, pp. 486–492.

REACTIONS.—The action of chlorine monoxide on organic compounds. S. Goldschmidt and H. Schüssler. *Ber.*, March 11, 1925, pp. 566–571.

The action of sulphuryl chloride on amino-phenols. W. Eller and V. Lorenz. *Ber.*, March 11, 1925, pp. 494–497.

ANALYSIS.—The estimation of the *m*-cresol content in crude cresol. W. Qvist. *Z. anal. Chem.*, No. 8, 1925, pp. 289–314.

The determination of sulphide, polysulphide and thiosulphate in alkali and alkaline earth polysulphide solutions. E. Schulek. *Z. anal. Chem.*, No. 9, 1925, pp. 352–358.

### Miscellaneous

RUBBER.—The constitution of the rubber molecule. S. C. J. Olivier. *Rev. Trav. Chim. des Pays-Bas*, March 15, 1925, pp. 229–238.

HYDROGENATION.—Note on catalytic hydrogenation with hydrogen and platinum. E. Waser. *Helv. Chim. Acta*, March 16, 1925, pp. 117–125.

REACTIONS.—The mechanism of substitution reactions in the aromatic nucleus. Part II. E. de B. Barnett, J. W. Cook and M. A. Matthews. *Rec. Trav. Chim. des Pays-Bas*, March 15, 1925, pp. 217–223.

The efficacy of oxalic acid for splitting off alcohol. E. Waser and K. Sander. *Helv. Chim. Acta*, March 16, 1925, pp. 106–111.

ACIDS.—The constitution and configuration of the quinic acids. P. Karrer, R. Widmer and P. Riso. *Helv. Chim. Acta*, March 16, 1925, pp. 195–202.

# Patent Literature

## Abstracts of Complete Specifications

229,247. Acid Proof Coating for Metallic Vessels. Felten and Guilleaume, Carlswerk Akt.-Ges, Köln-Mulheim, Germany. International Convention date, February 12, 1924.

This invention employs a coating of graphite. The wall of the vessel is covered with a coating of pure graphite containing sufficient caoutchouc to make it adhere firmly to the vessel. A second coating is then applied containing more graphite and less caoutchouc, and then further layers containing increasing proportions of graphite and decreasing proportions of caoutchouc, the outer layer containing substantially only graphite. This layer is not attacked by acids, including nitric acid, and the inner adhering coating is thereby protected.

229,714–5. Oxygenated Organic Compounds such as Methanol, Manufacture of. J. Y. Johnson, London. From Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, August 23, 1923.

229,714. Carbon monoxide and/or dioxide can be reduced by means of hydrogen at increased pressure and temperature with the aid of certain catalysts to obtain methanol, provided that the proportion of hydrogen is greater than that of the carbon oxides. In this invention, the catalysrs employed are metal oxides or compounds which are not reduced by hydrogen or carbon monoxide at temperatures up to 550° C. The catalysts employed include oxides, hydroxides, or carbonates of alkali, alkaline earth, or earth metals, such as aluminium, glucinum, zirconium, thorium, and cerium, or mixtures or compounds of magnesia or alumina with oxides of lead, bismuth thallium, zinc, cadmium, copper, tin, antimony, silicon, boron, and titanium. Iron, nickel, and cobalt should not be present. The reaction is preferably effected at a temperature of 300°–600° C., and pressure above 50 atmospheres, and may be carried out in a circulating system or by employing several apparatus in series. The methanol is extracted by cooling without reduction of pressure. Several examples are given, employing as catalysts potash-lime, magnesium chromate, magnesium or zinc oxide and potassium or rubidium hydroxide or carbonate, and copper and alumina. Other catalysts mentioned include mixtures of potassium, caesium, or rubidium compounds with an oxide of uranium, aluminium, chromium, manganese, cerium, lanthanum, thorium, zirconium, or yttrium, or mixtures or compounds of zinc oxide with oxides of aluminium, barium, rare earth metals, chromium, magnesium, manganese, tantalum, titanium, tungsten, or vanadium.

229,715. In the above process for manufacturing methanol, another series of catalysts are employed which contain one or more of the elements copper, silver, gold, zinc, cadmium, and lead as hydrogenating elements, and also one or more of the elements titanium, vanadium, chromium, manganese, zirconium, cerium, thorium, niobium, tantalum, molybdenum, tungsten, uranium, boron or compounds of these. The catalyst should be free from alkali compounds, and also iron, nickel and cobalt. Reference is directed in pursuance of Section 7, Sub-section 4, of the Patents and Designs Acts, 1907 and 1919, to Specification No. 20,488/1913.

229,719. Anthraquinone Sulphonic Acids, Production of. J. Thomas, and Scottish Dyes, Ltd., Murrell Hill Works, Carlisle. Application date, August 31, 1923.

Anthraquinone sulphonic acids are produced by treating ortho-benzoyl-benzoic acid with oleum in the presence of mercury, a mercury compound, or vandium compound. The oleum employed is of 60–65 per cent. strength, and the temperature of the reaction is 150°–160° C. In an example, of the production of anthraquinone-α-α–disulphonic acids, a mixture of orthobenzol-benzoic acid is stirred into oleum in such proportions that the mixture finally contains anthraquinone and 40 per cent. oleum. The mixture is gradually raised to 160° C., cooled, and then treated for the isolation of the α-α-disulphonic acids of anthraquinone in any of the usual ways. Detailed examples are also given of the production of anthraquinone-β-sulphonic acid, anthraquinone-α-sulphonic acid. These acids may also be obtained from anthraquinone recovered from a previous melt in place of a portion of orthobenzoyl-benzoic acid.

229,750. Metal Oxides, Production of. Wiskemann, Smith and Co., Ltd., Wool Exchange, London, E.C.2. From J. Plantz, Trier, Postfach, Germany. Application date, November 26, 1923.

The object is to treat sulphur compounds of metals, particularly earth metals and alkaline earth metal sulphates, to produce the corresponding oxides. These compounds are first raised to the necessary temperature by heat from an external source, and are then reduced and maintained at a high temperture by means of coal gas, water gas, blast furnace gas, etc. The reduced material may be oxidised by an oxidising gas to produce the oxides. Alkaline earth metal sulphates, such as strontium sulphate, which are difficult to decompose, may be treated by this process. Gas and air may be burned in contact with the material to raise it to 1750° C., and the supply of air is then discontinued so that the sulphate is reduced to sulphite by the hydrogen and carbon monoxide. The material is then treated with air alone to convert the strontium sulphite into oxide. Reference is directed in pursuance of Section 7, Sub-section 4, of the Patents and Designs Acts of 1907 and 1919, to Specifications 203,798 and 3,174/1914.

229,768. Power Gas and Phosphorus, Process for Producing. E. Britzke, 27 and 28, Bolschoj Afanassievsky Erculok, Moscow. Application date, December 1, 1923.

A gas producer is charged with a mixture of phosphorus and fuel, and in operation the phosphates are reduced by the incandescent carbon yielding phosphorus. The gas obtained differs from the usual power gas in that it contains only small quantities of carbon dioxide. This is due to the fact that the phosphorus reacts with the carbon dioxide producing carbon monoxide, which enriches the producer gas. The phosphorus pentoxide which is also produced is reduced to phosphorus by the incandescent carbon, so that only small quantities of phosphorus are necessary to enrich the producer gas. The raw phosphates employed are usually mixed with silicates to produce a slag which can be periodically drawn off. The gases obtained may be treated for the recovery of phosphorus, and then used as power gas, or they may be burned in a Cowper apparatus at about 900° C. to obtain metaphosphoric acid. The metaphosphoric acid may be precipitated in a Cottrell apparatus, or orthophosphoric acid obtained by the action of steam.

229,774 and 229,973. Hydrocyanic Acid, Process for the Production of. G. Bredig, and E. Elod, Karlsruhe, Baden, Germany. Application date, December 1, 1923.

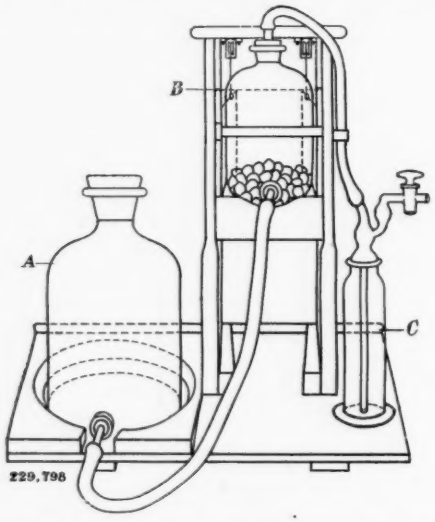
229,774. Hydrocyanic acid is produced by passing a mixture of nitrogen compounds, *e.g.*, ammonia, and carbon compounds, *e.g.*, carbon monoxide, at a raised temperature over a catalyst. The catalysts employed are the oxides of the rare earths, *e.g.*, cerium, lanthanum, didymium, and oxides of thorium, titanium, molybdenum, uranium, or vanadium. Good results are obtained by the use of cerium oxide two parts and aluminium oxide one part. These catalysts may partly be replaced by silicon, zirconium, or titanium carbides, also silicides such as calcium silicide. The carbides and silicides act catalytically, and also as good heat conductors. The mixtures or compounds such as silit or " siloxicon " may be used. When carbides or silicides are used, the catalyst may be heated by employing it as an electric resistance. The gaseous carbon compounds may be employed in considerable excess, *e.g.*, five parts of carbon monoxide to one part of ammonia. It is also advantageous to add a " protecting " gas such as hydrogen or nitrogen ; the decomposition of the ammonia is thus reduced. The temperature employed is about 500°–600° C., and the yield of hydrocyanic acid is nearly quantitative.

229,973. In the process for producing hydrocyanic acid described in Specification No. 229,774 above, the hydrogen employed as the " protecting " gas is in the proportion of 2–10 times the volume of ammonia. Nitrogen may also be employed, or gases which contain these, such as water gas, or vapour from molasses waste. The carbon monoxide or gases containing it should be present in the proportion of 2–10 times the volume of ammonia. The gases employed need not be

preliminarily dried, and need not be specially purified. A yield of 95 per cent. may be obtained.

229,798. SULPHURETTED HYDROGEN GENERATORS. J. Lewis, Willowdene Cottage, Abbs-cross Lane, Hornchurch, Essex, J. Dick, 5, Mawson Close, Merton Park, London, S.W.19 (trading as Dick, Son, and Lewis, 31, Farringdon Road, London, E.C.1), and W. C. Hope, 63, Great College Street, Camden Town, London, N.W.1. Application date, December 17, 1923.

A bottle A is connected by an india-rubber tube to another bottle B, mounted in a stand and containing a layer of glass balls to prevent the passage of any solid material into the rubber tube. A frame carrying the bottle B is suspended from a pair of pulleys by means of counterweights so that it may be



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moved vertically. The bottle B is connected by a rubber tube to a vessel C, a glass tube extension reaching nearly to the bottom of this vessel, whilst an outlet tap for gas is provided as shown. The ferrous sulphide is placed in the bottle B, and the bottle A is filled with hydrochloric acid. The bottle B is then pushed down until acid runs in and reacts with the ferrous sulphide, and the gas passes through the glass wool in the vessel C to the outlet. The reaction is stopped by releasing the bottle B, which rises to its highest position and empties of acid.

229,946. SODIUM TRIBISMUTH TARTRATE, PROCESS FOR THE PREPARATION OF. C. F. Boehringer and Soenne, G.m.b.H., Mannheim-Waldhof, Germany, and G. Giemsa, Sierichstrasse 82, Hamburg, Germany. Application date, August 26, 1924.

Sodium tribismuth tartrate is obtained by the reacton of pure bismuth hydroxide in excess with disodium tartrate. The resulting complex compound is very soluble, and has a high bismuth content (71·14 per cent.). Its formula is

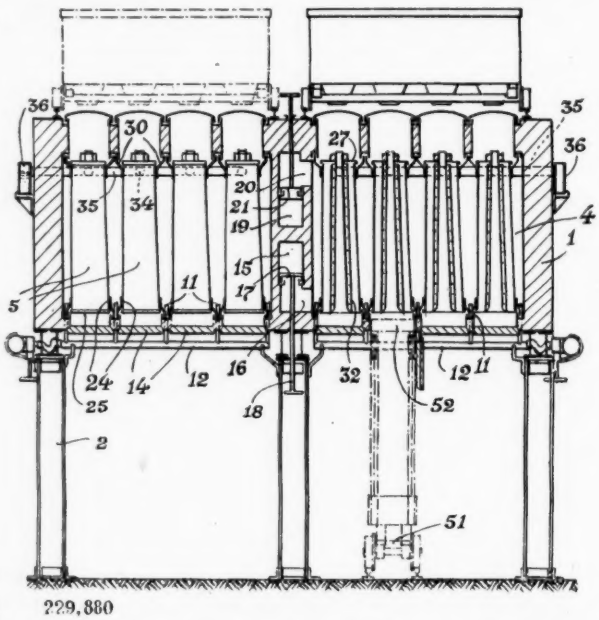
COONa.CHO.BiO.CHO.BiO.COO.BiO.

229,958. ESTERS, MANUFACTURE OF. F. Hefti, Altstetten, Zürich, and W. Schilt, Olgastrasse 8, Zürich, Switzerland. Application date, October 31, 1923.

The reaction between metal salts of organic acids and alkyl halides to produce esters only produces a small yield of the ester after long heating. It has now been found that a practically quantitative yield can be obtained by the addition to the mixture of small amounts of organic bases such as pyridine, or quinoline, in the proportion of less than 1 per cent. Carboxylic acids of the aliphatic, alicyclic, and aromatic-aliphatic series can be converted into their esters in this way. The reaction is complete in a short time with aromatic carboxylic acids, but the non-aromatic carboxylic acids, and particularly their salts, are much more inert. The temperature must be higher and the heating more prolonged, and it has been found that the potassium salts are more active than the sodium salts. The sodium salts of aliphatic carboxylic acids are not very active with the exception of sodium cinnamate. Some examples are given. Compare Specification No. 227,232 (see THE CHEMICAL AGE, Vol. XII, p. 162).

229,880. LOW TEMPERATURE CARBONISATION. E. C. Zuyderhoudt, 267, Avenue Louise, Brussels. Application date, March 21, 1924.

A structure 1 forming the ovens rests on pillars 2 and is divided by partitions into a series of square chambers 4 containing the vertical retorts 5. The successive chambers are connected to each other by flues fitted with valves (not shown), and each chamber is provided with a number of burners 11 fed by pipes 12. Between two rows of chambers 4 is a waste gas flue 15, into which each chamber can be connected by a flue 16 provided with a valve 17, having a sand joint and operated by a rod 18. A flue 19 having no connection to



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the outside is arranged parallel to the flue 15, so that any two or more chambers 4 may be put into communication by means of flues 20 and valves 21. Each retort comprises a conical casing of sheet iron resting on supports 24 and having a removable bottom 25. A concentric conical member is provided in each retort, and carries a cover 27, while the conical casing 5 has upwardly extending arms 30 to keep it in position. Perforated metal strips 32 of **U**-shape in cross-section are secured to the outside of the inner cone to collect the distilled gases, which pass into a pipe 35 and thence to a collector 36. When treating extremely bituminous coal, the charge may be compressed by means of a loaded ring resting on the top. A charging hopper 34 runs on rails above the battery of retorts. To discharge the retorts, the doors 14 are opened and a truck 51 having a vertically movable platform 52 is brought under a retort. The platform 52 is raised, and the charge deposited on the platform, which is then lowered and removed.

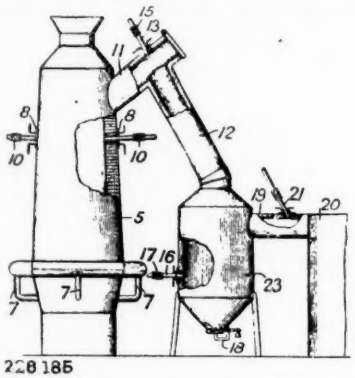
NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—212,569 (Soc. of Chemical Industry in Basle), relating to manufacture of 4-oxynaphthalene-1-arylketones, see Vol. X., p. 522; 219,922 and 223,190 (Sharp and Dohme, Inc.), relating to manufacture of alkyl and aralkyl resorcinols, see Vol. XI., pp. 353 and 630; 224,863 (L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude), relating to purification of coke oven gases and the like, see Vol. XII., p. 86.

## International Specifications not yet Accepted

228,185. PHOSPHORIC ACID AND PHOSPHATES. V. C. Works, Fisher Building, Chicago. Assignees of H. A. Brassert, 1632, Strauss Building, Chicago, and H. W. Easterwood, Fisher Building, Chicago. International Convention date, January 23, 1924.

In plant for the reduction of phosphates at high temperature to obtain phosphoric acid and phosphorus, air is admitted to the furnace, flues, downcomer, dustcatcher, and regenerator

to burn the phosphorus to control the temperature. The least amount of air is added to prevent deposition of phosphorus. Air is introduced through tuyeres 7 into the blast furnace 5 to burn the fuel. The gases pass through a conduit 11 and

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downcomer 12 to a dustcatcher 23, and air may be introduced through valves 10, 15, as required. Air may be admitted to the dustcatcher through valve 17, or this valve may be partly or wholly closed if elemental phosphorus is required. The gases then pass through flue 19 to a regenerator 20 where most of the phosphorus is burned by means of air admitted through the pipe 21.

228,195. SYNTHETIC DRUGS. Farbwerke vorm. Meister, Lucius and Brüning, Hoechst-on-Main, Germany. International Convention date, January 26, 1924.

An alkali compound of mono-isopropyl-barbituric acid is treated with an allyl halide at a raised temperature or under pressure, to obtain isopropylallyl-barbituric acid.

228,203. HYDROCYANIC ACID. J. A. Du Bois, Peseux, near Neufchatel, Switzerland. Assignee of Ges. für Kohlentechnik, Eving, Dortmund, Germany. International Convention date, June 29, 1923. Addition to 214,999. (See THE CHEMICAL AGE, Vol. XI., p. 16.)

Hydrocyanic acid is obtained from sulphocyanic acid compounds, salts, or derivatives such as esters, or compounds with amines, by vaporising or spraying the compound with air or oxygen, and passing the mixture through tubes of clay, silica, iron or aluminium at 350°-750° C. The tube surface has a catalytic effect. Non-volatile sulphocyanogen compounds may be obtained by distilling a solution in superheated steam, by passing superheated steam through the molten compound, by running a solution into a vessel at a high temperature, etc. Thus ammonium sulphocyanide may be slowly dropped into a vessel heated to 350° C and preheated air introduced. The gases are then passed over quartz heated to 500° C. in a quartz tube.

LATEST NOTIFICATIONS.

231,126. Method for decolorising fats and oils. H. Bollman. March 24, 1924.

231,134. Process for the production of ammonia from gases containing cyanide of hydrogen. Norsk Hydro-Elektrisk Kvael-Stofaktieselskabet. March 21, 1924.

231,140. Process for the production of fuel briquettes making use of asphaltic bitumens as agglomerants. L. Liais. March 18, 1924.

231,147. Process of effecting the decomposition of alkali-chlorides. Salzwerk Heilbronn Akt.-Ges., T. Lichtenberger and Dr. K. Flor. March 19, 1924.

231,149. Manufacture of new dyestuffs and intermediate products. Soc. of Chemical Industry in Basle. March 20, 1924.

231,150. Manufacture of new pharmaceutical products. Farbenfabriken Vorm. F. Bayer and Co. March 21, 1924.

231,157. Processes for the treatment of oils and fatty substances for the obtainment of a combustible gas and liquid products analogous to petroleum or naphtha. Benzonaftène. March 24, 1924.

231,159. Carbonisation of coal and other carbonaceous material. International Combustion Engineering Corporation. March 21, 1924.

231,161. Process of dissolving cellulose esters and cellulose ethers. E. Pfiffner and M. Ow-. Eschingen. March 24, 1924.

231,203. Method of carrying out chemical, and especially metallurgical processes at high temperatures. A. Helfenstein and Helfenstein-Elektro-Ofen Ges. March 24, 1924.

## Specifications Accepted with Date of Application

208,548. Centrifugal separators. Plauson's (Parent Co.), Ltd. December 13, 1922.

210,081. Azo-dyestuffs, Process for preparing. Farbwerke vorm. Meister, Lucius and Brüning. January 18, 1923.

213,250. *d*-1-nerolidol, Process for the manufacture of. M. Naef and Co. March 22, 1923.

213,881. Petroleum distillates, Process of decolorising. Union Oil Co. of California. April 4, 1923.

214,210. Rubber from latex, Process for the manufacture of dry, well-preserved. E. S. A. Cohen. April 12, 1923.

215,004. Volatile metals from their sulphides, Methods of producing. H. G. Flodin and E. G. T. Gustafsson. April 25, 1923.

216,527. Azo-dyestuffs, Manufacture of. Chemische Fabrik Griesheim-Elektron. May 22, 1923. Addition to 211,752.

217,183. Synthetic production of ammonia, Purification of gases intended for the manufacture of hydrogen for use in. Soc. Chimique de la Grande Paroisse (Azote et Produits Chimiques). June 4, 1923.

221,773. Hydrocarbons from tars, Process for the manufacture of high-percentage and pure solid. Rutgerswerke Akt.-Ges. and L. Kahl. September 11, 1923.

222,120. Vat-dyestuffs containing sulphur, Manufacture of. Farbwerke vorm. Meister, Lucius and Brüning. September 19, 1923.

223,878. Bituminous substances, Distillation of. F. Caspari. October 24, 1923.

230,413. Extraction of Hydrogen from Gaseous Mixtures. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. March 8, 1924.

230,550. Ores and the like, Concentrating and separating machine for. E. Harr. December 13, 1923.

230,561. Muffle furnaces. August's Muffle Furnaces, Ltd., and H. F. Coggon. December 19, 1923.

230,590. High-percentage alcohol. E. Urbain and R. Urbain. January 23, 1924.

230,600. Dyestuffs. R. F. Thomson, J. Thomas, and Scottish Dyes, Ltd. February 5, 1924.

230,607. Gamma-tetra-hydroquinolone, Manufacture of—and of intermediate products. British Dyestuffs Corporation, Ltd., W. H. Perkin, and G. R. Clemo. February 12, 1924.

230,681. Creosote oil from crude coal gas, Process and apparatus for the recovery of. M. E. Nicklin. June 4, 1924.

230,705. Ammoniacal liquors, Purification of crude. H. E. Potts. (*Z. M. Stinnes.*) July 25, 1924.

230,637. Vulcanisation of caoutchouc. S. J. Peachey and A. Skipsey. March 26, 1924.

## Applications for Patents

Bemberg Akt.-Ges., J. P. Recovery of ammonia from waste waters. 7,827. March 23. (Germany, May 6, 1924).

Billington, C. H. Purifying and separating liquids. 8,234. March 27.

Blagden, J. W. and Howard and Sons, Ltd. Manufacture of hydrogenated cinchona alkaloids. 7,906. March 24.

Bolton, E. R. and Lush, E. J. Hydrogenation and dehydrogenation compounds. 7,915. March 24.

Braun, C. A. Preparation of stable aqueous emulsions from high-molecular hydro-carbons. 8,072. March 25.

British Dyestuffs Corporation, Ltd. Manufacture of metallic xanthates. 8,299. March 27.

Carpmael, W. and Farbenfabriken vorm. F. Bayer and Co. Manufacture of lithopone. 8,303. March 27.

Cassella and Co., Ges., L. and Ransford, A. J. Manufacture of benzanthrone derivatives. 8,302. March 27.

Danilowitsch, A. and Petroff, G. Preparation of a condensation product from phenol and formaldehyde. 8,024. March 25. (Germany, March 25, 1924).

Dufbank Tile Co., Dufton, W. J. S. and Obank, L. S., T., and W. J. Production of cement for artificial stone. 8,206. March 27.

Dumond, E. J. E. Process for enriching or refining crude graphite. 8,123. March 26. (France, April 23, 1924).

Edser, E. and Fowler, S. Treatment of crude cholesterol materials and manufacture of anti-corrosive preparations. 7,897. March 24.

Francis, G. Centrifugal separators. 7,813. March 23.

Graesser-Monsanto Chemical Works, Ltd., and Lefroy, H. M. Treatment of textile, etc., materials. 7,886. March 24.

Helfenstein, A. Carrying out metallurgical, etc., processes. 7,892. March 24. (Austria, March 24, 1924).

Heyl, G. E. Cracking mineral oils. 8,013. March 25.

Heyl, G. E. Cement and clay burning. 8,036. March 25.

Petersen, H. Process of obtaining sulphuric acid. 8,130. March 26. (Germany, April 1, 1924).

Pfeiffer, P. Manufacture of a compound from diethylbarbituric acid and 4-dimethylamino-2 : 3-dimethyl-1-phenyl-5-pyrazolone. 8,180. March 26. (Austria, March 27, 1924).

Phister, A. B. Chemical fire-extinguishers. 7,774. March 23.

Schultz, E. Recovery and conversion of light oil or spirit from crude oils, coal, etc. 8,062. March 25.

Weyman, J. E. Means for drying, screening, and treating neutralised sulphate of ammonia crystals. 8,083. March 26.

# London Chemical Market

*The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

*London, April 2, 1925.*

THE improvement noted in our last week's report continues and quite a satisfactory volume of business has been transacted. Prices generally maintain their firmness and stocks of a number of imported articles appear to be on the short side.

Export trade continues dull, although a little better inquiry has been received from the Colonies.

## General Chemicals

ACETONE has been in steady request and a satisfactory business has been booked at about £75 per ton ex wharf main U.K. ports.

ACID ACETIC.—A slight reduction in price is reported for 80% technical, which has stimulated demand, and it is apparent that quite a considerable number of second hand parcels are now cleared from the market. The present price of technical 80% is £39 per ton, and pure £41 per ton.

ACID CITRIC continues inactive, although a fair amount of inquiry is on the market which should shortly result in a substantial business being placed. Price is without change at 1s. 5d. per lb.

ACID FORMIC has been a bright feature of the market and a considerable amount of business has been booked at £51 to £52 per ton for 85% technically pure.

ACID LACTIC is in good request, especially on export account, Continental makers are reported to be comfortably occupied for some months. The present price of 50% by weight is £43 per ton ex warehouse.

ACID OXALIC.—A firmer tendency is noticed in this market and practically all the second hand parcels have been cleared. Price is firm at 3¾d. per lb. ex wharf.

ACID TARTARIC.—A fair amount of business has been transacted in this product and inquiry is heavy. Price at the moment shows no change, although the forward situation seems to be hardening.

ALUMINA SULPHATE.—Business has not been quite so active in this product, and although no change is reported, it now appears to be at rock bottom, and the present price favours buyers.

ARSENIC.—Only a small amount of business has been offered, and price remains easy; from one or two quarters a better interest has been received, but so far business has not been of large dimensions.

BARIUM CHLORIDE.—The Continental position is much firmer and makers are fairly well occupied for some little time. Price is inclined to advance and a large amount of business has been transacted.

CREAM OF TARTAR continues in moderate request with price unchanged at £76 to £77 per ton.

EPSOM SALTS.—Price is slightly easier owing to large quantities being offered. Business has been satisfactory.

FORMALDEHYDE remains quiet with price unchanged at about £43 per ton.

LEAD ACETATE continues in good demand with few stocks available. The forward position is also firm, and price is round about £46 for white, and £44 for brown.

LIME ACETATE is neglected with no appreciable change in price.

METHYL ALCOHOL.—A better demand has been felt and the price remains firm at £50 per ton.

PRUSSIATE OF POTASH.—Slightly lower prices have been in evidence during the last few days owing to the forced realisations on the part of weak holders; forward position is firm, with price at present about 7½d. per lb.

SODA ACETATE continues in very small demand and price easy at £21 15s. to £22 per ton.

SODA HYPOSULPHITE.—A fair amount of business has been transacted for the photographic quality, but commercial is in keen competition with imported makes.

SODA PRUSSIATE.—Demand is still depressed and price is slightly easier at about 4d. per lb.

SODA NITRITE has been in active request and price is firm at £22 10s. to £23 per ton ex warehouse.

SODA SULPHIDE.—In brisk demand for export, but Continental material is competing in this market.

TARTAR EMETIC is in short supply owing to the large amount of export business being booked, and price is firm at 1s. to 1s. 1d. per lb.

ZINC SULPHATE.—In fair request at about £13 10s. to £14 per ton for imported makes.

## Coal Tar Products

The tone of the market generally in coal tar products is quiet, and there is little fresh business passing.

BENZOL 90% is unchanged at 1s. 8½d. per gallon on rails.

PURE BENZOL is somewhat easier, and is quoted at 1s. 10d. per gallon.

CREOSOTE OIL is quiet, and is worth from 6¼d. to 6½d. per gallon on rails in the North, while the price in London is 7d. to 7½d. per gallon.

CRESYLIC ACID is unchanged, the pale quality 97/99% being quoted at 1s. 9d. per gallon on rails in bulk, while the dark quality 95/97% is quoted at 1s. 7d. to 1s. 8d. per gallon.

SOLVENT NAPHTHA remains steady at about 1s. 4d. per gallon on rails.

HEAVY NAPHTHA is quoted at 1s. 1d. to 1s. 2d. per gallon on rails.

NAPHTHALENES show no change from last week, the lower qualities being worth from £3 15s. to £4 5s. per ton; 74/76% quality, £5 to £5 10s. per ton; and 76/78% quality, £6 to £6 10s. per ton.

PITCH remains dull; prices are unchanged. To-day's approximate values are 40s. to 42s. 6d. per ton main U.K. ports.

## Latest Oil Prices

LONDON.—LINSEED OIL firm and 15s. to 17s. 6d. higher. Spot, £45 10s.; April, £44 5s.; May/August, £44 10s.; September-December, £43 10s. RAPE OIL quiet and unchanged. Crude, crushed, £48; technical, refined, £51. COTTON OIL steady. Refined common edible, £45; Egyptian crude, £39 10s.; deodorised, £47. TURPENTINE firm and 3d. per cwt. higher. American, spot, 63s., and May, 63s., paid and sellers.

HULL.—LINSEED OIL.—Naked, spot and April, £44; May-August, £44 2s. 6d.; September-December, £43 5s. COTTON OIL: Naked, Bombay, crude, £36; Egyptian, crude, £37 5s.; edible refined, £41; deodorised, £43 10s.; technical, £39 10s. GROUND NUT OIL.—Crushed/extracted, £47; deodorised, £51. SOYA OIL.—Extracted, £38; crushed, £38 10s.; deodorised, £48. RAPE OIL.—Extracted, £47 per ton, net cash, ex mill. CASTOR OIL and COD OIL unchanged.

## Nitrogen Products Market

*Export.*—During the last week the market has remained steady at £13 10s. per ton f.o.b. and at this figure the producers are disposing of the quantities available. It is anticipated that this price will be unchanged until the middle of May brings the usual seasonal decline in the home demand.

For further forward there is at present little enquiry, and it is expected that there will be a drop in export prices as the synthetic plants in several countries are beginning to operate on a larger scale.

*Home.*—The home demand is now in full swing, and the producers are disposing of about 500 tons per day for this delivery. It is expected that this rate of sale will continue well into May, as the season is a late one on account of the wetness of the month of February. Home prices will remain unchanged until the end of May.

*Nitrate of Soda.*—The Nitrate Market continues weak, cargoes for prompt arrival can be purchased at £11 13s. to £11 15s. per ton c.i.f.

The nitrate position is a little better in the U.S. on account of the breakdown of the resistance of the cotton growers to the present scale of prices, but this has so far had only a local effect.

It is expected that the nitrate producers will carry large stocks into the new fertiliser year.

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at retailers' works.*

## General Heavy Chemicals

Acid Acetic, 40% Tech.—£21 to £23 per ton.
Acid Boric, Commercial.—Crystal, £45 per ton, Powder, £47 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 65s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d.; Contract, £10 d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chloride (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 7d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d. Normal business.
Nickel Ammonia Sulphate.—£38 per ton d/d. Normal business.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—2¾d. to 3d. per lb.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£24 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£16 to £17 per ton, according to quantity, f.o.b., 1-cwt. iron drums included.
Sodium Chlorate.—2¾d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool. Nominal.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—About £15 per ton d/d. Contract £14 15s. Carr. pd.
Sodium Sulphide Crystals.—£9 5s. per ton d/d. Contract £9 2s. 6d. Carr. pd.
Sodium Sulphide, Pea Crystals.—£15 per ton f.o.r. London, 1-cwt. kegs included.

## Coal Tar Products

Acid Carbolic Crystals.—5d. per lb. Quiet demand. Crude 60's, 1s. 5d. to 1s. 7d. per gall. Little demand.
Acid Cresylic 97/99.—1s. 8d. to 2s. per gall. Rather more inquiry. Pale, 95%, 1s. 6d. to 1s. 10d. per gall. Dark, 1s. 6d. to 1s. 9d. per gall. Little demand.
Anthracene Paste 40%.—4d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7d. to 8d. per gall. Unstrained, 6d. to 7d. per gall.
Benzol.—Crude 65's.—9d. to 11½d. per gall., ex works in tank wagons. Standard Motor, 1s. 4½d. to 1s. 6d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 1s. 11d. per gall., ex works in tank wagons. Supplies very scarce.
Toluol,—90%, 1s. 7d. per gall. More inquiry. Pure, 1s. 10d. to 2s. per gall. Steady demand.
Xylol Commercial.—2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. to 8¾d. per gall. Little demand. Middle Oil, Heavy, Standard specification, 6d. to 7d. per gall., according to quality and district. Market not quite so firm.
Naphtha.—Crude, 8d. to 9d. per gall. Solvent 90/160, 1s. 4d. to 1s. 6d. per gall. Demand good. Solvent 90/190, 11d. to 1s. 1d. per gall. Steady business.
Naphthalene Crude.—Cheaper in Yorkshire than in Lancashire. Drained Creosote Salts, £3 to £5 per ton. Steady but quiet. Whizzed or hot pressed, £6 to £9 per ton.
Naphthalene.—Crystals and Flaked, £12 to £15 per ton, according to districts.
Pitch.—Medium soft, 37s. 6d. to 42s. 6d. per ton, according to district. Not much business.
Pyridine.—90/160, 17s. 6d. to 18s. per gall. Market easier. Fair demand. Heavy, 11s. to 12s. per gall. Not much inquiry.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid H.—3s. 9d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—5s. 8d. per lb. 100% basis d/d.
Acid Salicylic, technical.—11½d. to 1s. per lb. Price reduced. Improved demand.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7½d. per lb. naked at works.
Aniline Salts.—8d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s. 8d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
*p*-Chlorphenol.—4s. 3d. per lb. d/d.
*p*-Chloraniline.—3s. per lb. 100% basis.
*o*-Cresol 29/31° C.—3d. per lb. Demand quiet.
*m*-Cresol 98/100%.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
*p*-Cresol 32/34° C.—2s. 1d. to 2s. 3d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
*p*-Dichlorbenzol.—£85 per ton.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. 2d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzol.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
Monochlorbenzol.—£63 per ton.
*a*-Naphthol.—2s. 3d. per lb. d/d.
*B*-Naphthol.—1s. per lb. d/d.
*a*-Naphthylamine.—1s. 3½d. per lb. d/d.
*B*-Naphthylamine.—3s. 9d. per lb. d/d.
*m*-Nitraniline.—4s. 2d. per lb. d/d.
*p*-Nitraniline.—2s. 2d. per lb. d/d.
Nitrobenzene.—5¼d. to 5½d. per lb. naked at works.
*o*-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronapthalene.—10d. per lb. d/d.
*p*-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
*p*-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
*m*-Phenylene Diamine.—4s. per lb. d/d.
*p*-Phenylene Diamine.—9s. 9d per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
*o*-Toluidine.—10d. per lb.
*p*-Toluidine.—2s. 3d. per lb. naked at works.
*m*-Toluylene Diamine.—4s. per lb. d/d.

## Wood Distillation Products

Acetate of Lime.—Brown £11. Quiet market. Grey, £15 10s. per ton. Firmer. Liquor, 9d. per gall. 32° Tw.
Acetone.—£78 per ton.
Charcoal.—£7 5s. to £9 per ton, according to grade and locality. Fair demand.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall. 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 9d. per gall. Only moderate market. 60% O.P. Solvent, 5s. per gall. 40% O.P.
Wood Tar.—£4 to £5 per ton. Demand slack and stocks being held.
Brown Sugar of Lead.—£43 10s. per ton.

## Rubber Chemicals

Antimony Sulphide.—Golden, 7½d. to 1s. 5d. per lb., according to quality. Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality
Arsenic Sulphide, Yellow.—2s. per lb.
Cadmium Sulphide.—4s. 4d. per lb., according to quantity.
Carbon Bisulphide.—£32 to £35 per ton, according to quantity.
Carbon Black.—6d. to 6½d. per lb., ex wharf.
Carbon Tetrachloride.—£62 to £67 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 4d. per lb.
Indiarubber Substitutes, White and Dark.—5¾d. to 7½d. per lb.
Lamp Black.—£48 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s per ton.
Mineral Rubber "Rubpron."—£16 to £18 per ton f.o.r. London.
Sulphur.—£10 to £12 per ton, according to quality.
Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£56 to £65 per ton.

**Thiocarbanilide.**—2s. 6d. per lb.
**Vermilion, Pale or Deep.**—5s 6d. per lb. Dearer.
**Zinc Sulphide.**—1s. 1d. per lb.

## Pharmaceutical and Photographic Chemicals

**Acid, Acetic 80% B.P.**—£43 per ton ex wharf London in glass containers.
**Acid, Acetyl Salicylic.**—2s. 9d. to 2s. 10d. per lb., according to quantity. Market slightly easier.
**Acid, Benzoic B.P.**—2s. to 2s. 3d. per lb., according to quantity, for synthetic product.
**Acid, Boric B.P.**—Crystal £51 per ton, Powder £55 per ton. Carriage paid any station in Great Britain.
**Acid, Camphoric.**—19s. to 21s. per lb.
**Acid, Citric.**—1s. 4½d. per lb., less 5% for ton lots. Slightly upward tendency.
**Acid, Gallic.**—2s. 9d. per lb. for pure crystal, in cwt. lots. Easier.
**Acid, Pyrogallic, Crystals.**—6s. per lb. for 1 cwt. lots. 7s. 6d. per lb. for 7-lb. lots according to quantity. Steady market.
**Acid, Salicylic.**—1s. 5½d. to 1s. 6d. per lb., according to quantity. Market rather easier.
**Acid, Tannic B.P.**—2s. 9d. per lb. Quiet steady demand.
**Acid, Tartaric.**—1s. 1d. per lb., less 5%. Very firm. Demand good.
**Amidol.**—9s. per lb., d/d.
**Acetanilide.**—1s. 9d. per lb. Price lower owing to competition.
**Amidopyrin.**—13s. 9d. per lb. Slightly lower.
**Ammonium Benzoate.**—3s. to 3s. 6d. per lb., according to quantity.
**Ammonium Carbonate B.P.**—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
**Atropine Sulphate.**—12s. 6d. per oz. for English make.
**Barbitone.**—11s. 9d. per lb. Price lower owing to competition.
**Benzonaphthol.**—4s. 3d. per lb. spot. Weaker. Demand quiet.
**Bismuth Salts.**—Prices reduced by about 1s. 3d. to 2s. 3d. per lb. on account of the fall in the price of the metal.
**Bismuth Carbonate.**—10s. 6d. to 12s. 6d. per lb.
**Bismuth Citrate.**—10s. 3d. to 12s. 3d. per lb.
**Bismuth Salicylate.**—9s. to 11s. per lb.
**Bismuth Subnitrate.**—8s. 8d. to 10s. 8d. per lb. according to quantity.
The price of Bismuth Metal has been raised from 5s. to 7s. 6d. per lb. Bismuth Salts have been advanced accordingly.
**Borax B.P.**—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
**Bromides.**—Potassium, 1s. 7d. to 1s. 9d. per lb.; sodium, 1s. 8d. to 1s. 11d. per lb.; ammonium, 2s. to 2s. 3d. per lb. all spot. Upward tendency. Forward prices higher.
**Calcium Lactate.**—1s. 7d. to 1s. 9d., according to quantity. Fair demand and steady market.
**Chloral Hydrate.**—3s. 10d. per lb., duty paid.
**Chloroform.**—2s. 6d. per lb. for cwt. lots.
**Creosote Carbonate.**—6s. 9d. per lb. Little demand.
**Formaldehyde.**—£42 per ton, in barrels ex wharf.
**Glycerophosphates.**—Fair business passing. Calcium, soluble and citrate free, 7s per lb.; iron, 8s. 9d. per lb.; magnesium, 9s per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 50%, 2s. 6d per lb.
**Guaiacol Carbonate.**—7s. 10d. to 8s. per lb.
**Hexamine.**—2s. 9d. per lb. for cwt. lots. For bold crystal.
**Homatropine Hydrobromide.**—25s. to 30s. per oz.
**Hydrastine Hydrochloride.**—English make offered at 120s per oz.
Hydrogen Peroxide (12 vols).—1s. 8d. per gallon for makers' works, naked.
**Hydroquinone.**—4s. 3d. per lb. Nominal.
**Hypophosphites.**—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
**Iron Ammonium Citrate B.P.**—1s. 11d. to 2s. 3d. per lb.
**Magnesium Carbonate.**—Light Commercial, £36 per ton net. Light pure, £46 per ton.
**Magnesium Oxide.**—Light Commercial, £72 10s. per ton, less 2½% price reduced; Heavy Commercial, £25 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
**Menthol.**—A.B.R. recrystallised B.P., 43s. 6d. per lb.; April delivery. Synthetic 26s. to 35s. per lb., according to quality.
**Mercurials.**—Market very quiet. Mercury slightly firmer. Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb.; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb.
**Methyl Salicylate.**—1s. 7d. to 1s. 11d. per lb., according to quantity.
**Methyl Sulphonal.**—19s. 3d. per lb. Cheaper.
**Metol.**—11s. per lb. British make.
**Morphine and Salts.**—Reduced by 1s. to 1s. 3d. per oz.
**Paraformaldehyde.**—2s. 2d. for B.P. quality. Keen competition has brought prices down.
**Paraldehyde.**—1s. 2d. to 1s. 6d. per lb., in free bottles and cases.
**Phenacetin.**—4s. 9d. per lb. in cwt. lots. Unsettled. Supplies exceed demand.
**Phenazone.**—6s. 3d. to 6s. 6d. per lb. Spot price lower than forward.
Phenolphthalein.—4s. 6d. to 5s. per lb. for cwt. lots.
**Potassium Bitartrate 99/100% (Cream of Tartar).**—83s. per cwt., less 2½% for ton lots.
**Potassium Citrate.**—1s. 10d. to 2s. 2d. per lb.
**Potassium Ferricyanide.**—1s. 9d. per lb. Quiet.
**Potassium Iodide.**—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
**Potassium Metabisulphite.**—7½d. per lb., 1-cwt. kegs included. f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7½d. per lb., spot; commercial, 8d. to 8½d. per lb., carriage paid. Slight reaction after recent advance.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—4s. 9d. per lb. In fair quantities. Supplies exceed demand.
Saccharin.—63s. per lb. in 50-lb. lots.
Salol.—3s. 6d. per lb., for cwt. lots. Slightly dearer.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb. From natural benzoic acid. Supplies of good quality available.
Sodium Citrate, B.P.C., 1923.—1s. 11d. to 2s. 2d. per lb., according to quantity.
Sodium Hyposulphite, Photographic.—£13 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—75s. per cwt., for ton lots and upwards.
Sodium Salicylate. Powder, 2s. 2d. to 2s. 3d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb. Flake, 2s. 6d. per lb. Strong demand, market firmer.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. per ton, minimum 5 ton lots, according to quantity; 1 cwt. kegs included.
Sulphonal.—13s. per lb. accepted for quantity.
Thymol.—18s. per lb. Firmer.

## Perfumery Chemicals

Acetophenone.—10s. 9d. per lb. Cheaper.
Aubepine.—11s. 3d. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb. Cheaper.
Anethol (M.P. 21/22° C.).—4s. 6d. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 7½d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 7½d. per lb.
Benzaldehyde free from Chlorine.—3s. 1½d. per lb.
Benzyl Benzoate.—3s. 1½d. per lb.
Cinnamic Aldehyde Natural.—16s. per lb.
Coumarin.—16s. per lb. Cheaper.
Citronellol.—22s. per lb.
Citral.—10s. per lb.
Ethyl Cinnamate.—10s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—10s. 6d. per lb.
Geraniol (Palmarosa).—28s. 6d. per lb.
Geraniol.—12s. 6d. to 20s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—15s. per lb.
Linalol ex Bois de Rose.—24s. 6d. per lb.
Linalyl Acetate.—24s. 6d. per lb.
Methyl Anthranilate.—10s. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—42s. 6d. per lb. Advanced.
Musk Xylol.—11s. per lb.
Nerolin.—4s. 6d. per lb.
Phenyl Ethyl Acetate.—15s. per lb.
Phenyl Ethyl Alcohol.—14s. per lb.
Rhodinol.—40s. per lb. Advanced.
Safrol.—1s. 10d. per lb.
Terpineol.—2s. per lb.
Vanillin.—25s. to 25s. 6d. per lb.

## Essential Oils

Almond Oil, Foreign S.P.A.—13s. 9d. per lb.
Anise Oil.—2s. 9d. per lb. Advanced.
Bergamot Oil.—16s. per lb.
Bourbon Geranium Oil.—22s. 6d. per lb.
Camphor Oil.—62s. 6d. per cwt.
Cananga Oil, Java.—11s. per lb.
Cinnamon Oil, Leaf.—6d. per oz.
Cassia Oil, 80/85%.—10s. per lb.
Citronella Oil.—Java, 85/90%, 5s. 2d. per lb. Ceylon, 3s. to 3s. 3d. per lb., according to quality. Cheaper.
Clove Oil.—7s. 6d. per lb. Cheaper.
Eucalyptus Oil, 70/75%.—2s. per lb.
Lavender Oil.—French 38/40% Esters, 35s. per lb.
Lemon Oil.—3s. 9d. per lb.
Lemongrass Oil.—5s. 9d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Palma Rose Oil.—15s. 3d. per lb.
Otto of Rose Oil.—Bulgarian, 42s. 6d. per oz. Anatolian, 28s. per oz.
Palma Rosa Oil.—16s. 9d. per lb.
Peppermint Oil.—Wayne County, 65s. per lb. Japanese, 19s. 3d. per lb.
Petitgrain Oil.—9s. 9d. per lb.
Sandal Wood Oil.—Mysore, 26s. 7d. per lb. Australian, 18s. 6d. per lb.

# Scottish Chemical Market

***The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.***

*Glasgow, April 2, 1925.*

THE heavy chemical market has been quiet during the past week, and there is little of importance to record. Prices remain fairly steady, with the exception of magnesium chloride, which Continental merchants are now quoting at about 15s. per ton less than a week ago.

### Industrial Chemicals

ACID ACETIC.—In moderate demand and price unchanged. 96/98% glacial, £56 to £67 per ton, according to quality and packing; 80% pure, £42 to £44 per ton; 80% technical, £41 to £43 per ton, packed in casks, delivered c.i.f. U.K. ports.

ACID BORACIC.—Crystals or granulated, £45 per ton; powdered, £47 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at about 5¼d. per lb., delivered. Offered for forward delivery at a fraction less.

ACID CITRIC, B.P. CRYSTALS.—In moderate demand and price unchanged at about 1s. 4½d. per lb., less 5%, ex wharf, spot delivery. Offered for early delivery at about the same figure.

ACID FORMIC, 85%.—Unchanged at about £49 per ton, ex wharf, prompt delivery. Offered for early delivery at about £48 10s. per ton, ex wharf.

ACID HYDROCHLORIC.—In little demand; price 6s. 6d. per carboy, ex works.

ACID NITRIC 80°.—£23 18s. per ton, ex station, full load trucks.

ACID OXALIC, 98/100%.—Quotations from the continent slightly higher. Now quoted 3¾d. per lb., ex wharf. Spot material unchanged at about 4d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Unchanged at about 11¾d. per lb., less 5%, ex store.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot lots unchanged at about £7 5s. per ton, ex store. Offered from the continent for prompt shipment at about £6 12s. 6d. per ton c.i.f. U.K. ports.

ALUM.—Lump potash alum offered for prompt shipment from the Continent at about £8 10s. per ton c.i.f. U.K. ports. Spot material unchanged at £9 10s. per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 1s. 5½d. per lb., ex station, containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton, packed in 5 cwt. casks, delivered U.K. ports.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb. delivered, according to quantities, containers extra.

AMMONIA MURIATE.—Grey galvanizers' crystals of English manufacture, unchanged at about £30 per ton, ex store, packed in casks. Bags, £1 per ton less. Offered from the continent at about £25 15s. per ton c.i.f. U.K. ports. Fine white crystals quoted £21 2s. 6d. per ton c.i.f. U.K. ports, prompt shipment from the continent.

ARSENIC, WHITE POWDERED.—Spot lots unchanged at about £32 per ton, ex store. Offered for forward delivery at £28 10s. per ton, ex wharf. Some little inquiry from the continent.

BARIUM CARBONATE, 98/100%. — Quoted £8 10s. per ton c.i.f. U.K. ports. Prompt shipment from the continent.

BARIUM CHLORIDE, 98/100%.—Spot material now quoted £10 10s. per ton, ex store. Foreign material on offer at £9 7s. 6d. per ton c.i.f. U.K. ports, prompt shipment.

BLEACHING POWDER.—Spot lots quoted £10 10s. per ton, ex station, contracts 20s. per ton less.

BARYTES.—English material unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton c.i.f. U.K. ports.

BORAX.—Unchanged. Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English makers' price unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, ex station. Continental quoted £3 15s. per ton c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 5s. per ton, ex works, packed in casks, free.

COPPER SULPHATE.—British material quoted £24 10s. per ton f.o.b. U.K. ports. Continental available at about £24 per ton, ex store. Offered from the continent at about £23 to £24 per ton, according to packages c.i.f. U.K. ports.

FORMALDEHYDE, 40%.—Quoted £40 per ton c.i.f. U.K. ports. Spot material on offer at £43 10s. per ton, ex store.

GLAUBER SALTS.—White crystals of English manufacture quoted £4 per ton, ex store or station; continental on offer at about £3 10s. per ton c.i.f. U.K. ports.

LEAD, RED.—Imported material quoted £43 to £43 10s. per ton, ex store, spot delivery.

LEAD, WHITE.—On offer at £45 per ton, ex store.

LEAD ACETATE.—Refined white crystals offered from the continent at £46 per ton c.i.f. U.K. ports, prompt shipment. Spot lots available at about £47 per ton, ex store. Dark brown quality quoted £39 10s. per ton c.i.f. U.K. ports.

MAGNESITE, CALCINED.—Quoted £8 per ton, ex station, prompt delivery.

MAGNESIUM, CHLORIDE.—Continental manufacturers advise considerable reduction in price. Now quoted about £2 15s. per ton c.i.f. U.K. ports.

POTASH, CAUSTIC, 88/92%.—Unchanged at about £29 per ton, ex wharf, prompt shipment from the Continent. Spot material available at about £30 10s. per ton, ex store.

POTASSIUM BICHROMATE.—Price for home consumption, 5d. per lb. delivered.

POTASSIUM CARBONATE, 96/98%.—Still higher quotations from the continent. Price about £25 per ton c.i.f. U.K. ports. Spot material now quoted £25 15s. per ton, ex store.

POTASSIUM CHLORATE.—Practically unobtainable for immediate delivery. Offered for April/May shipment at about 3¼d. per lb. c.i.f. U.K. ports.

POTASSIUM NITRATE, SALTPETRE.—Refined granulated 99% quoted £24 10s. per ton c.i.f. U.K. ports. Spot material available at about £28 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 7¾d. per lb., ex store. Offered for early delivery at 7½d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—Nominally 7¾d. per lb., ex store, but could probably be obtained for less.

SODA, CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 12s. 6d. per ton; broken, 60%, £17 2s. 6d. per ton; powdered, 98/99%, £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery, contracts 20s. per ton less.

SODIUM ACETATE.—In poor demand. Spot material now available at £21 15s. per ton, ex store. Offered for prompt shipment at about £20 per ton, ex wharf.

SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton, ex quay or station; M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Price for home consumption 4d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; powdered or pea quality, £1 7s. 6d. per ton more; Alkali, 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at about £9 15s. per ton, ex station. Continental rather dearer at about £8 7s. 6d. per ton, c.i.f. U.K. ports. Spot material still available at about £9 15s. per ton, ex store. Pea crystals of English manufacture quoted £14 per ton, ex station.

SODIUM NITRATE.—Ordinary quality quoted £13 7s. 6d. per ton, ex store. 96/98%, refined quality, 7s. 6d. per ton extra.

SODIUM NITRATE, 100%.—Offered from the continent at about £23 per ton, c.i.f. U.K. ports. Spot material available at about £24 15s. per ton, ex store.

SODIUM PRUSSIATE, YELLOW.—Quoted 4½d. per lb., ex store, but could probably be obtained at a fraction less.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton f.o.b. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English manufacturers quote—60/62% solid, £15 per ton; broken £1 per ton more; flake £2 per ton more. Crystals, 31/34%, £9 5s. per ton, carriage paid U.K. stations, minimum 4 ton lots, with slight reduction for contracts over a period. Continental material slightly cheaper. 60/62% solid offered at about £11 per ton, c.i.f. U.K. ports; broken, £12 per ton, c.i.f. U.K. ports. 30/32% crystals, £8 5s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £9 10s. per ton; roll, £8 10s. per ton; rock, £8 7s. 6d. per ton; ground, £8 5s. per ton, ex store. Prices nominal. American crude sulphur on offer at about £5 2s. 6d. per ton, c.i.f. U.K. ports.

ZINC CHLORIDE, 96/98%.—Continental manufacture quoted £23 per ton, c.i.f. U.K. ports. English material for export on offer at about £25 to £26 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Rather better inquiry. Price now about £12 10s. per ton, ex store.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

### Coal Tar Intermediates and Wood Distillation Products

BETA NAPHTHOL.—Fair home inquiries. Price 11d. to 11½d. per lb.

DIETHYLANILINE.—Some home inquiries. Price 3s. 7d. per lb.

ALPHA NAPHTHYLAMINE.—Good home inquiries. Price 1s. 3d. per lb.
METANITRANILINE.—Good export inquiries. Price 4s. per lb.
METANILIC ACID.—Good export inquiries. Price 2s. 6d. per lb.
PARANITRANILINE.—Good export inquiries. Price 2s 2d. to 2s. 3d. per lb.

## The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

*Manchester, April 2, 1925.*

THE consumption of chemicals by the large-scale users—the cotton and woollen textiles, the iron and steel, and the paper industries—is, of course, adversely affected by the reduced rate of operations, and at the moment there is little indication of improvement in this direction. Most of the buying in the chemical market here is of small parcels and the aggregate amount of business is very considerably below normal, although a slightly bigger volume has been reported this week. Export inquiries are fairly numerous but actual business is disappointing. Values have shown few fluctuations of importance and in most cases appear to have reached bottom.

### Heavy Chemicals

Saltcake is still rather dull, with prices nominally unchanged at about £3 15s. to £4 per ton. Glauber salts are fairly steady, but the demand for this material is restricted. Bleaching powder is maintained at about £9 10s. per ton and a quietly steady business is being put through. The demand for caustic soda keeps up to its recent level both for home consumption and for export; quotations vary from £15 12s. 6d. for 60 per cent. strength to £18 per ton for 76–77 per cent. strength. Prussiate of soda is only in moderate request but prices keep up at 4d. per lb. Hyposulphite of soda is moving in comparatively small quantities; photographic crystals are on offer at £13 10s. to £13 15s. per ton and commercial quality at about £9 5s. Bichromate of soda meets with a fair demand at the unchanged price of 4d. per lb. Sodium sulphide is steady at £13 15s. to £14 per ton for 60–65 per cent. concentrated solid and £9 10s. for crystals, though business is quiet. Phosphate of soda continues to be offered at from £12 10s. to £13 per ton. Soda crystals are maintained at £5 5s. per ton and a fair amount of business is being done. Bicarbonate of soda meets with a moderate amount of inquiry at £10 10s. per ton. Alkali is in steady request for both branches of trade and values are held at £6 15s. per ton. Chlorate of soda is being called for in moderate quantities at 2⅝d. per lb. Acetate of soda is quiet but unchanged at last week's level of £20 per ton.

Caustic potash, 90 per cent. strength, is fairly steady at £29 to £30 per ton, but the demand is not particularly pressing. Carbonate of potash is currently quoted at £24 10s. per ton, inquiry being moderately active. Prussiate of potash is rather quiet at round 7d. per lb. Permanganate of potash is in moderate request at from 6¾d. per lb. for commercial quality to 7¼d. for pharmaceutical. Chlorate of potash is still on offer at round 2¾d. per lb. Bichromate of potash is fairly steady at 5d. per lb., with business only on a small scale.

Sulphate of copper is in much the same position as at last report; values are unchanged at round £24 10s. per ton, but business is on a comparatively restricted scale. Arsenic still arouses only a very limited amount of interest and prices continue weak though not quotably changed; white powdered, Cornish makes, is on offer at round £30 per ton in Manchester. Nitrate of lead is in moderate request at £41 10s. to £42 per ton. Commercial Epsom salts are well held at £4 15s. per ton and a fair demand is being experienced; magnesium sulphate, pharmaceutical quality, is still quoted at about £6 5s. Acetate of lime is quiet and rather easier at £15 per ton for grey and £9 15s. to £10 per ton for brown material. Acetate of lead is also cheaper at £45 to £46 for white and £41 for brown.

### Acids and Tar Products

Acetic acid is fairly steady although not in pressing demand; commercial, 80 per cent. quality, is currently quoted at £40 to £41 per ton, and glacial at £67 10s. Tartaric acid is quiet but unchanged at round 1s. per lb. Citric acid is still selling at 1s. 4½d. per lb. Oxalic acid is rather better than it has been at about 3¾d. per lb.

Quotations for coal-tar products show little variation from last week and on the whole the demand is quiet. About 40s. per ton is the nominal value of pitch but buyers are scarce. Solvent naphtha is not very active at about 1s. 5½d. per gallon. Creosote oil is steady at 6¾d. to 7d. per gallon. Naphthalenes are quiet at £15 per ton for refined quality and £4 15s. and upwards for crude. Carbolic acid is more or less nominal at 5d. to 5½d. per lb. for crystallised and 1s. 7d. per gallon for crude.

## German Chemical Market

BUSINESS conditions have not improved. Caustic potash was further traded at $13·50, but no business of importance was done. Chlorate of potash maintains an upward tendency, as there are hardly any offers on hand. Small lots were sold at $13·50. Chloride of calcium was traded at £3 6s. for lots of 15 tons. Tartaric acid, crystallised or powder, was quoted at $51. Epsom salts, technical crystals, could be obtained at £3 1s. Chloride of magnesium, which was traded at £4 at the beginning of the year, has dropped rapidly in price, and larger lots were offered at £2 3s. Carbonate of potash, 96/98% was quoted at $11·50. Some business could be done in zinc white, red seal, packed in original casks, at £37 15s. Sulphide of sodium, 60/62% conc. fused, in original drums, was offered at £9 11s., and in lumps at £10 11s. Salammoniac, 98/100%, was on the market at $8·85. Sulphate of soda was weaker, being quoted at $1·09. Quotations for bicarbonate of soda were unchanged.

## Sir Max Muspratt on 1924 Trade

### A Survey of Achievements and Possibilities

SIR MAX MUSPRATT, BT., speaking at the annual meeting of the United Alkali Co. (Ltd.), (briefly reported last week), said that the company at length had emerged from the quagmire of war taxation. Provision for their liability had been made throughout the period of uncertainty, with the result that there remained a final credit balance of £60,000.

The board was pleased to report that, following a fall in the cost of production, and to induce further business, the company made reductions in the prices of its products, and the return in increased trade had justified the reductions.

### Alkali and Chlorine Progress

Sir Max said that the alkali and chlorine branches had shown expansion, and plant had been increased at a considerable cost. In sulphuric acid neither they nor their fellow makers had recovered from the dislocation of the war. One great consuming industry, in which they were also largely interested—namely, the superphosphate industry—was hard hit by competition as a result of depreciated exchanges on the one hand and agricultural depression on the other. Their mines in Spain were also adversely affected by reduced consumption, but owing to the policy adopted by the board some three years ago the immediate effect was not serious. In some products German competition was becoming rather pressing. In most cases they believe this to be temporary, and with more stabilised conditions in that country uneconomic competition was likely to be reduced, and in economic competition they could hold their own.

In order to have in this country a nucleus plant for nitric acid without importing from abroad they have worked out in detail standardised plant for nitric acid. Though not actually new, it had not been fully worked out in this country. This acid was necessary for the dye and explosive industries. In peace time the economical advantages were not overwhelming, but its national importance was so great that they had put complete information and working drawings at the disposal of the Government without charge or conditions.

### Progress in Dyes

The dye industry, in which they have some direct interest, and even greater indirect interest, had been subject to considerable public controversy. Progress had been made, but would have been greater had there been co-operation with the chemical industry. During recent months a feeling towards co-operation had been shown, and discussions were in progress which should lead to considerable advantage to the dye makers and dye users, and ultimately to themselves. They had for several years, by research and experiment, been preparing for this opportunity, and dye experts who had seen their work and programme had expressed most favourable opinions.

# Company News

BROKEN HILL PROPRIETARY CO., LTD.—A half-yearly dividend of 1s. per share has been declared payable on May 6. This is the first distribution since August, 1921.

HERBERT GREEN AND CO., LTD.—The directors have declared an interim dividend of 5 per cent. in respect of the year 1925 on the ordinary shares, payable on March 31.

AMALGAMATED ZINC (DE BAVAY'S).—A dividend is announced of 1s. per share, less income-tax, payable on April 30 to all members on the London register at the close of business on April 10.

VICKERS, LTD.—The directors have decided not to recommend the payment of a dividend on the ordinary shares for the past year. No dividend was declared for 1923, but 5 per cent. was paid for 1922.

BRITISH GLUES AND CHEMICALS, LTD.—The directors announce that it has been found necessary to postpone payments of the half-yearly dividend due on April 1 on the 8 per cent. cumulative preference shares. The dividend is now three and a half years in arrears, the last payment being for the period to September 30, 1921.

ASSOCIATED PORTLAND CEMENT MANUFACTURERS, LTD.—The profits for 1924 were £660,643, and £227,479 was brought forward. After deducting debenture interest and preference share dividend, and appropriating £297,387 for depreciation, reserves, and sinking funds, there remains £228,869, which it is proposed to carry forward. No dividend on the ordinary shares is recommended.

WRIGHT, LAYMAN AND UMNEY.—The report for the year ended December 31 last shows a trading profit, including income from investments, of £23,000, which with the amount brought forward, leaves to the credit of profit and loss £29,136. The directors recommend a further dividend of 10 per cent. on the ordinary shares, making 20 per cent. for the year 1924, less income-tax at 4s. 6d., leaving to carry forward £6,601.

RECKITT AND SONS (LTD.).—It was reported at the annual meeting that the company's profits for 1924 were in excess of those of any previous year. A final dividend of 1s. 9d. per ordinary share was declared, making 4s. per share for the past year, an increase of 6d. per share compared with 1923, and £282,532 was transferred to the reserve, raising that fund to £1,500,000. The amount to which the employees will be entitled under the Prosperity Bonus Scheme is £80,000, and the sum carried forward was £248,081.

JOSEPH CROSFIELD AND SONS, LTD.—The report for the year to November 30 last states that, after charging repairs, renewals, and alterations, depreciation and insurance, the balance outstanding at the credit of profit and loss account of £384,063 has been appropriated as follows: dividend on 5 per cent. cumulative preference shares £20,000, on 6 per cent. cumulative preference shares £30,000, on 6½ per cent. cumulative preference shares £65,000, on 7½ per cent. "A" cumulative preference shares £112,500, and on ordinary shares at the rate of 10 per cent. £100,000, leaving to be carried forward £56,563.

UNITED GLASS BOTTLE MANUFACTURERS.—The profits for the year, including £130,279 brought in, amount to £249,788. From this the directors have transferred to general reserve £40,000, to capital reserve £18,204, and to income-tax equalistion reserve £20,000, leaving a balance of £171,584. The directors have since December 31 last applied £37,485 in payment of a dividend of one year on account of arrears on the 7½ per cent. tax free preference shares, and propose towards the end of April to pay a further half-year on account of arrears of preference dividend, leaving to be carried forward £115,357.

TARMAC, LTD.—The report of the directors for the year ended December 31 states that the net profit, including £6,323 interest and dividends from subsidiary companies, amounts to £104,011, to which has to be added £17,412 brought forward, making the disposable balance £121,424. An interim dividend of 1s. per share and depreciations absorb £44,620, leaving a balance of £76,803; and the directors now recommend the following: £3,500 for directors' fees for the year; to pay a final dividend of 2s. per share (free of income-tax) for the year; transfer £10,000 to general reserve; and carry forward £18,674.

## New Chemical Trade Marks

### Applications for Registration

*This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.*

*Opposition to the Registration of the following Trade Marks can be lodged up to May 1, 1925.*

"INCA."

455,840. For fluid to prevent formation of scale in boilers. Tinkers, Ltd., Daisyfield Boiler Works, Ashton Road, Newton, Hyde, near Manchester, boiler makers and engineers. January 30, 1925.

"EMPEROR."

455,556. For raw or partly prepared, vegetable, animal, and mineral substances used in manufacturers, not included in other Classes. Class 4. Goodlass, Wall and Co., Ltd., 42 and 44, Seel Street, Liverpool, Lancashire, manufacturers. January 22, 1925. (To be Associated. Sect. 24.)

## Chemical Trade Inquiries

*The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.*

CATTLE FEEDING STUFFS.—A firm of agents in Marseilles wishes to represent British firms, on a commission basis, for the sale of cattle feeding stuffs. (Reference No. 369.)

RED LEAD.—An old-established Parsee firm in Bombay is desirous of securing a local agency for red lead. (Reference No. 358.)

CHEMICAL MANURES.—A general commission agent in Cairo desires to obtain agency of a British firm manufacturing chemical manures. (Reference No. 381.)

CHEMICALS.—The Department of Navigation and Ports at Buenos Aires is inviting tenders for the supply of chemicals and lubricating material. (Reference C. 1516.)

PAINTS.—A commission agent in Norrköping (British) desires to represent British manufacturers of red and white lead, white zinc, anti-fouling and anti-corrosive paints. (Reference No. 413.)

TAR.—80,000 galls. of dehydrated refined tar for road work, for Clutton Rural Council. Tenders to Mr. J. S. Dury, Temple Cloud, Bristol, by April 6.

OILS, PAINTS, ETC.—Tenders invited by Cambridge Corporation for supply of oils, greases, paints, lubricating oils, to Town Clerk, by April 18.

## American Market Movements

(From *Drugs and Chemical Markets.*)

HEAVY chemical demand quiet with manufacturers reporting fairly heavy shipments against contracts. Zinc chloride scarce on spot and higher from manufacturer. Potassium chloride quite firm. Intermediates quiet. Light oils firm with toluene still scarce. Naphthalene, creslyic acid, and phenol dull with stocks large.

Oils quiet with vegetable oils weakening almost throughout. Animal oils continue stronger with added interest in fish oils. Essential oils in better demand. Oil juniper berries higher. Oil lemon active and firm. Oil peppermint easier. Oil citronella, Java, firm.

Fine chemicals are in fair demand only. Bromides quiet. Thymol lower. Menthol firm on spot and for shipment. Mercury higher. Camphor firmer. Cod liver oil lower.

### Tariff Changes

FRANCE.—A decree withdraws the duty of 10 per cent. *ad valorem* formerly levied on export of margarine, oleomargarine, edible fats, and similar substances.

NORWAY.—The importation of powdered bone and animal manure has been prohibited.

BRITISH INDIA.—It is proposed to add the following articles to the free list: Carbonate of lime, urea, raw rubber, raw sulphur, spraying machines.

NEWFOUNDLAND.—It is proposed to add kerosene oil to the free list.

# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry make no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

NORRIS BROS., LTD., 107/11, Moorgate Station Chambers, E.C., chemical dealers. (C.C., 4/4/25.) £11 4s. 2d., Dec. 12, and £15 19s. 4d. March 3.

ROUSSELOT & CIE., LTD., 2A, Suffolk Lane, Cannon Street, E.C., manufacturing chemists. (C.C., 4/4/25.) £10 13s. 4d. December 6.

## Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

BELL (JOHN) AND CROYDEN, LTD., London, W., chemical manufacturers. (M., 4/4/25.) Registered March 20, £50,000 debentures plus 5 per cent. premium; general charge. *£130,600. July 18, 1924.

CUTLER HILL COLOURS AND CHEMICALS, LTD., Manchester. (M., 4/4/25.) Registered March 14, £500 mortgage, to Miss M. Howard, Parkfield, Middlewich Road, Northwich; charged on property at Failsworth, with plant, etc. *Nil. December 31, 1923.

MOULDENSITE, LTD., Darley Dale, manufacturers of phenol formaldehyde products. (M., 4/4/25.) Registered March 19, £12,000 debenture, to W. C. McGrath and another, Mosley Street, Manchester; general charge.

NORWOOD WHARF CHEMICAL CO., LTD., Southall (M., 4/4/25.) Registered March 17, £9,460 debentures general charge.

SMYRNA ANTIMONY CO., LTD., London, W.C. (M., 4/4/25.) Registered February 25, £7,500 (not ex.) charge, etc., to Cookson and Co., Ltd., Milburn House, Newcastle-on-Tyne; charged on all assets of company, including a Firman issued by the Imperial Ottoman Government under which the Dpuli Kaya Mine, Smyrna, is held. *Nil. December 3, 1924.

### Satisfaction

MARLEY HILL CHEMICAL CO., LTD. (M.S., 4/4/25.) Satisfaction registered March 20, £2,000, part of amount registered March 21, 1921.

## London Gazette

### Company Winding Up Voluntarily

HARRISON CLARK AND CO., LTD. (C.W.U.V., 4/4/25.) A. C. Nash, Incorporated Accountant, of Swan Chambers, Copthall Avenue, London, E.C.2, appointed liquidator, March 27th. Meeting of creditors at the offices of the Society of Incorporated Accountants, 50, Gresham Street, London, E.C.2, on Wednesday, April 15, at 11 a.m. Creditors' claims by April 27.

### Partnership Dissolved

J. SPENCE AND C. F. COWAN, analytical chemists, 10, Bothwell Street, Glasgow, as at March 25th, 1925, by mutual consent, by the retiral of John Spence. The business will be carried on by Charles Frederick Cowan under the same name, and he will uplift all debts due to and discharge debts and liabilities of the firm.

## Receiverships

CLEMENT AND JOHNSON, LTD. (R., 4/4/25.) J. Giffard and R. T. Matthews obtained an Order of Court dated February 27, continuing the appointment of W. S. Dawson, of 31, Great James Street, W.C., as manager of the property of the company until May 28, 1925.

LARNE SALT AND ALKALI CO., LTD. (R., 4/4/25.) A. J. H. Shay, of Bilbao House, New Broad Street, E.C.2, was appointed Receiver on March 10, 1925, under powers contained in debentures dated August 7, 1924, and January 29, 1925.

LEONARDS MANUFACTURING CHEMISTS, LTD. (R., 4/4/25.) A. M. Hobbs, of 64, Great Portland Street, W.1, was appointed Receiver and Manager on March 17, under powers contained in instrument dated February 16, 1925.

## New Companies Registered

A. J. BOLT, JR. (PORTSMOUTH), LTD., 97, St. Thomas Street, Portsmouth. Manufacturing chemist. Nominal capital, £2,000 in £1 shares.

CLEVELAND CHEMICAL CO., LTD., 94, Old Broad Street, London, E.C.2. Wholesale and retail chemists, chemical manufacturers, drysalters, oil and colourmen, etc. Nominal capital, £100 in 50 7 per cent. cumulative preference shares of £1 each and 1,000 ordinary shares of 1s. each.

HOWROYD, McARTHUR AND CO., LTD., Bull Lane, Aintree, near Liverpool. Manufacturers of and importers of tanning extracts, chemicals and products of any nature for tanning, currying, dyeing, staining, colouring, varnishing, etc. Nominal capital, £75,000 in £1 shares.

KILL RUST PAINT MANUFACTURING CO., LTD. Paint manufacturers, manufacturers of and dealers in varnish, japan, enamel, dyes, pigments, oils, oil substitutes, cements, etc. Nominal capital, £500 in 350 6 per cent. cumulative preference shares of £1 and 3,000 ordinary shares of 1s. Solicitors: Walbrook and Hosken, 4, St. Paul's Churchyard, London.

OTARK POLISH CO., LTD. Manufacturers and retailers of blacking and polish of all kinds, importers and manufacturers of and dealers in chemical, industrial and other preparations and articles. Nominal capital, £350 in £1 shares. Solicitors: Cohen Dunn Page and Moore, Audley House, Ely Place, London, E.C.1.

SCIENTIFIC ROADS, LTD., Station Approach, L.M. and S. Railway Co., Shipley, Yorks. Makers of and dealers in tar, bitumen and asphalte compounds of all kinds, chemicals and chemical substances, etc. Nominal capital, £1,000 in £1 shares.

THAMES GLASSWARE CO., LTD., 73-5, Lower Thames Street, London, E.C.3. Manufacturers, importers and exporters of and wholesale and retail dealers in all kinds of containers, vessels, bottles, cans, machines, appliances, etc., capable of being used in connection with the storage, supply and delivery of all kinds of liquids and solids, etc. Nominal capital, £500 in £1 shares.

TYNEDALE LEAD CO., LTD. Owners of lead and other mines; to search for, get, work and deal in lead, baryta, ochre, coal, iron, ironstone, brick earth, etc. Nominal capital, £5,000 in £1 shares. Solicitors: Nicholson and Martin, "E," Milburn House, Newcastle-on-Tyne.

### Professor's Poison Gas Mishap

REPORTS have just been published of an accident experienced by Professor Harold Maxwell-Lefroy at his laboratory at the Imperial College, South Kensington. He was experimenting with a sprayed mixture of "Lewisite" and mineral oil and was testing its effect upon flies. Interested in the flies, which were apparently unharmed, Professor Maxwell-Lefroy found that the gas was affecting his lungs and managed to warn men working near of the danger and escape himself. He is stated to have described the effects as a blistered tongue and windpipe, and a burning pain in the chest. He is now recovering.

"Lewisite" is an American invention and was ready at the end of 1918, but not used. Professor Maxwell-Lefroy considers that it would kill a human being in about two hours.